

FARM CHEMICALS

June Volume 123 No. 6 50 Cents

Pioneer Journal of the Industry



**Fertilizer industry
advisory panel resolves
marketing problems**



W. H. APPLETON

—Southern Sales Manager for P.C.A.—is a graduate of Auburn University. He taught agriculture at Southern A&M Institute and served with the Alabama Department of Agronomy. Next year will mark his 25th anniversary with the Potash Company of America.



ROY P. PENNINGTON

—P.C.A.'s Canadian Sales Representative—served as professor of Soil Technology at Penn State University, is Vice Chairman of the Advisory Fertilizer Board for Ontario and is Western Ontario Director of the Agricultural Institute of Canada.

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PUBLICATIONS AUDIT**

The national business magazine for the fertilizer and pesticide industries, **FARM CHEMICALS**, serves primarily those persons responsible for management, marketing and production. It has a qualified circulation for selected executive and supervisory persons within specified segments of these industries, as well as in certain closely allied fields. Subscription rates to all others are: in the U.S., its possessions, Canada, Cuba and Panama: \$6.00; in other countries: \$7.50. Current issue 50 cents. Back issues \$1.00. (Current issues become back copies on the 5th of the month following publication.) Established in 1894 as *The American Fertilizer*.

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THE COVER PICTURE

Twelve men getting together for a "bull session" on fertilizer problems will not necessarily cure all the headaches in the industry. They can, however, resolve these situations and some very worthwhile suggestions have been recommended. IMC has utilized these recommendations to better serve the industry and improve customer relations. *Photo courtesy of International Minerals & Chemicals Corp.*

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LETTERS

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SUCCESSFUL SELLING

Pryor, Okla.

I wish to compliment you on the series of twelve articles on "Successful Selling" that appeared in FARM CHEMICALS over the past several months. If it is possible to do so, I would like to obtain 20 copies of each of the articles.

If it is not possible for you to supply these copies, may we have permission to reproduce these articles? We would like to make them available to the technical and sales representatives of our company.

Very truly yours,
L. E. CRAIG
Director of Research
GRAND RIVER CHEMICAL DIV.
DEERE & CO.

Appreciating your cooperation and service in this matter, we are

Yours very truly,
W. F. ANDERSON
Credit Manager
ARCHER-DANIELS-MIDLAND CO.

New York City

... Your article, "The Credit Mess," is very well done and should do considerable good in bringing about a better understanding of credit on the part of your readers . . .

Sincerely yours,
E. T. SAVIDGE
Deputy Manager
Agricultural Commission
THE AMERICAN BANKERS
ASSN.

We wish to have you put us on the circulation list of FARM CHEMICALS.

Yours very truly,
W. H. GRAHAM
Managing Director
VESUBIO MINING
CORP., LTD.

Birmingham, Mich.

... Your publication certainly contains a lot of excellent information and might very well be of value to us as a source of data . . . Let me thank you for the excellent cooperation you gave us.

Sincerely Yours,
E. S. RUMELY
Manager, Product Planning
and Programming Office
Tractor and Implement Div.
FORD MOTOR COMPANY

THE "CREDIT MESS"

Minneapolis, Minn.

I would be pleased to receive a copy of the current issue FARM CHEMICALS which includes an article entitled "Credit Mess."

Would you send me a copy or inform me where I can purchase same. If you can send the copy from your office, I will be glad to remit the charges on receipt of invoice.

Baker, Ore.
Vesubio Mining Corporation, Ltd. is about to re-enter the field of fertilizer manufacturing. We have been off the market for 12 years. Formerly the business was conducted at Calexico, Calif. The new operation will be conducted out of Winnemucca, Nev. While setting up the new operation we are doing business out of our apartment in Baker, Ore.

PUBLICITY THAT SELLS

Bartlesville, Okla.

Please mail me five reprints of the article, "Write Publicity That Sells!" which appeared in the May 1960 issue of FARM CHEMICALS on page 24.

Thank you.

Very truly yours,
W. E. IRWIN
Manager, Customer Relations
PHILLIPS PETROLEUM CO.

LIQUID FERTILIZERS

New York City

We have read with much interest the articles about liquid fertilizers in the recent issues of FARM CHEMICALS. Incidentally, in the Letters column, in the May issue, we just noted a letter inquiring about tear-sheets of the articles.

We would appreciate your sending us six copies each of those reprints. Would you please bill us for the charge . . .

Very truly yours,
K. OKA
Produce Dept.
MITSUBISHI INTERNATIONAL CORP.

Seabrook, N. J.

I received a copy of FARM CHEMICALS, May issue, containing an excellent article entitled "Predicting Plant Disease," (in Cape May County, New Jersey).

Apparently the author was not familiar with the research on downy mildew on lima beans, which was inaugurated in 1948, with definite objectives pertaining to:

1. The breeding of a mildew resistant lima bean now known as *Thaxter*.
2. The manner in which mildew was carried from year to year in the fields.
3. The length of time between infection and its appearance.
4. Fungicides best suited for control, timing, and method of application.
5. Predicting the appearance of mildew through weather and temperature records . . .

Very sincerely yours,
FRANK APP
SEABROOK FARMING
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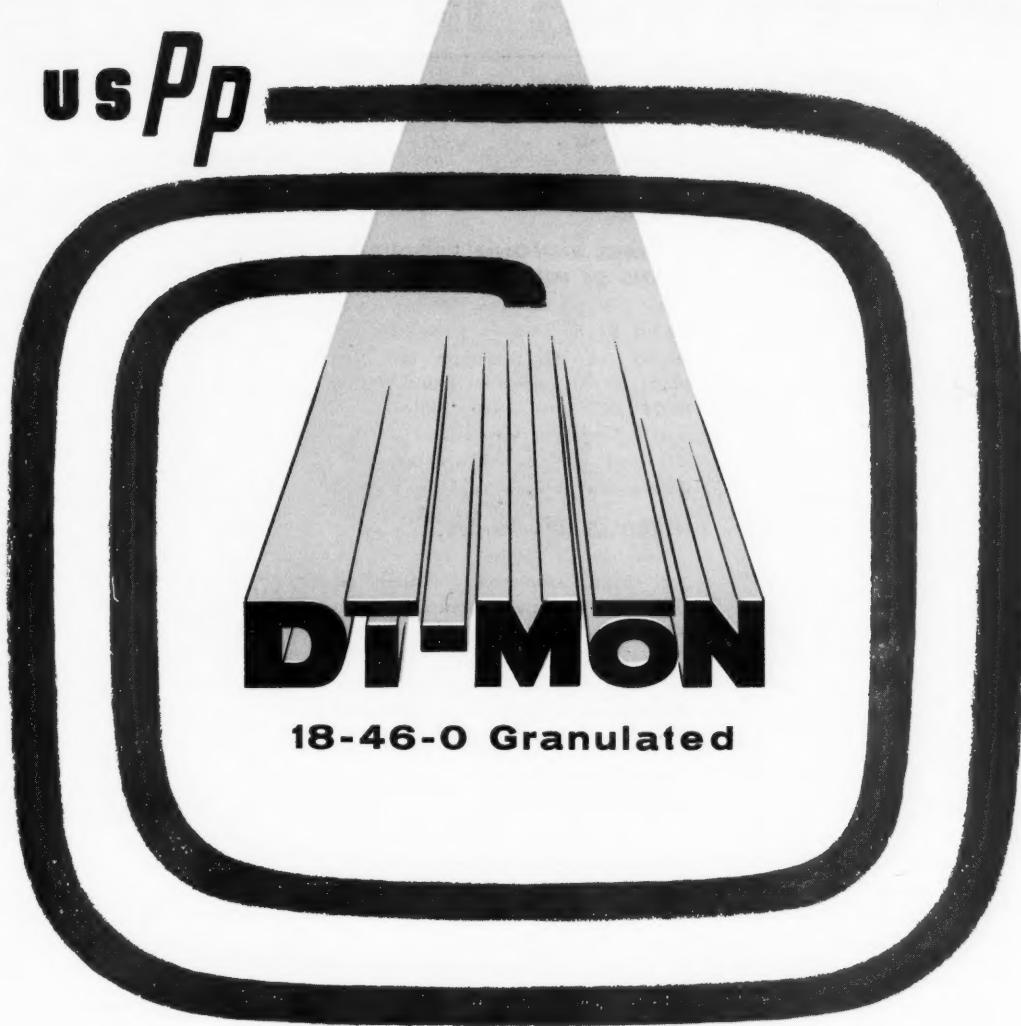
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WHAT'S DOING IN THE INDUSTRY

F
C

PGH. CHEMICAL SULFURIC ACID PLANT IN OPERATION

A new and expanded sulfuric acid plant at Pittsburgh Chemical Co.'s Neville Island installation has begun production, according to W. K. Menke, president of the firm, a recently-formed subsidiary of Pittsburgh Coke & Chemical Co.

The company said this expansion will boost its capacity by 70 per cent.

AWARD TO H. H. SHEPARD

At ceremonies on May 17, Dr. Harold H. Shepard received a Superior Service Award from the United States Department of Agriculture "for leadership in developing, improving and publishing pesticide statistics, and for significant contributions to defense planning relating to emergency distribution of agricultural chemicals."

For eight years Dr. Shepard has been reporting pesticide statistics to USDA and to the chemical industry. His book, "The Chemistry and Action of Insecticides" is a standard reference source for the industry. In addition, Dr. Shepard

has been teaching graduate courses at the University of Maryland for 12 years.

ST. PAUL AMMONIA PRODUCTS PLANS \$4 MILLION EXPANSION

St. Paul Ammonia Products will spend \$4 million to raise the capacity of its nitrogen fertilizer plant at Minneapolis from 88,000 to 110,000 tons a year, officials report. Construction will begin this fall and will be completed next spring, the officials said.

HERCULES UPS PRICES

Graduated price increases for anhydrous ammonia fertilizer on the West Coast have been announced by Hercules Powder Co.

Currently selling for \$66 a ton, the product will sell for \$69 a ton Aug. 1, \$72 a ton Oct. 1 and \$75 a ton Jan. 1. Prices are f.o.b. Hercules, Calif.

ADDRESS CHANGE

Union Carbide Plastics Co. and Linde Co., Divisions of Union Carbide Corp., have moved from 420 Lexington Ave. to 30 East 42nd Street, New York City 17.

NEW NAC PUBLICATION

"Pesticide Chemical Uses Accepted on a No-Residue Basis" is the title of a new manual compiled by the National Agricultural Chemicals Association from official USDA data.

L. S. Hitchner, NAC executive secretary, reports that following distribution of the February 1960 special issue of *NAC News and Pesticide Review* listing official FDA tolerances and exemptions for pesticide chemicals, the association received many requests for information regarding the status of certain specific uses of pesticides that were not included in the list because tolerances or exemptions had not been established for such uses.

"It was apparent from these requests," he said, "that a listing of certain pesticide uses for which numerical tolerances had not been assigned would be of valuable assistance to those whose interests involved the safe use of pesticides."

Copies of the new manual are available at the cost price of 50 cents from NAC, 1145 Nineteenth St., N. W., Washington 6, D. C.

A. H. STERNE DIES

Adolph H. Sterne, vice president, Tennessee Corporation, died in a private hospital in Atlanta on Thursday, May 5 following a two-weeks illness. Mr. Sterne became associated with Tennessee Corporation in 1919 and during his 41 years of service was active in the marketing of sulfuric acid to the fertilizer and chemical industries.

M. G. GEIGER SUCCUMBS

Marlin G. Geiger, 62, executive vice president of W. R. Grace & Co., died suddenly May 13 aboard a chartered plane landing in Linden, N. J., on a trip from Baltimore, Md. The only passenger on the twin-engine plane, Mr. Geiger apparently suffered a heart attack.

After graduation from The Pennsylvania State University Mr. Geiger joined Westvaco Chlorine Products Corp., and then became affiliated with Davison Chemical Corp., which now is a subsidiary of W. R. Grace.

Meeting Highlights

THIS MONTH:

National Plant Food Institute Convention

The Greenbrier, White Sulphur Springs, W. Va.

June 12. Registration.

June 13. R. E. Bennett, chairman of the board of directors of NPFI, will preside and present an address of welcome; Dr. Clifford M. Hardin, chancellor of the University of Nebraska and president of the American Assn. of Land Grant Colleges and State Universities, will speak; Jim Thomas, president of the Future Farmers of America, "A Future Farmer Looks at His Future in Agriculture;" Arthur H. Motley, president of the Chamber of Commerce of the U. S. on "The Political Responsibility of the Business Community" and the annual business meeting of the Institute will follow.

The afternoon program will be on NPFI's "Chemical Control Project" with Dr. Vincent Sauchelli, chemical technologist for the Institute, as moderator.

June 14. The Institute's new film, "Bread from Stone" will be shown, followed by presentation of scrolls to winners in "Soil Management Awards for Editors" contest by Mr. Bennett. Drs. George M. Beal and J. M. Boblen, of Iowa State University, will speak on "Dealer Characteristics Survey;" Murray Rennick, Rolla Feed Mills, on "What a Dealer Should Know;" and Ralph Everett, Miami, Fla., sales training consultant, on "Everything Depends on Sales."

The annual banquet will be held in the evening.

June 15. Twelve new directors and officers will be elected at a meeting of the Board of Directors.



Always before, this material had to be blasted. Then they bought a Michigan Tractor Shovel. It ended the trouble and

SAVED \$34,000 per year

Ability of their Michigan Tractor Shovel to dig a material which always before had to be blasted is saving an estimated \$34,000 per year for Davison Chemical Co., Bartow, Florida.

Together with its digging power, the Michigan also has proved mobile enough to work quickly in the same tight quarters as the smaller loaders it replaced.

The material being handled is triple super-phosphate—manufactured, stored and cured at this plant for at least four weeks. The Michigan is a Model 85A, 9000 lb lift capacity equipped with 1½ yd bucket and replaceable bucket teeth. Its savings have been fourfold...

ONE, because the 96 hp Michigan can effectively load the hard-set TSP, Davison has eliminated all blasting.

TWO, the plant has traded in one

of the two 7½ yd tractor shovels previously used to handle the blasted material, moved the second to another job. This transfer has resulted in substantial savings due to the Michigan's lower maintenance cost and greater capacity.

THREE, no less than 12 men (on a 3-shift basis) have been transferred to other jobs... 3 tractor shovel operators, 6 drillers, 3 dynamite handlers.

FOUR, with the elimination of blasting has come the elimination also of building repairs. No more are holes blown in the sides and top of the 25,000 ton capacity curing and storage shed.

40 to 45 loads moved hourly

Photo above shows typical operation. Like most loads, this one totals about 1½ cu yds, 1800 to 2000 lbs.

In seconds, the Michigan will turn, drive 25 to 150 ft, and feed the crusher hopper. Output, loaded by hopper conveyor into railcars, averages 40 to 45 Michigan bucket loads, 36 to 45 tons per hour.

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Through the years, Witco research has made Emcol Emulsifiers increasingly attractive to formulators. Their excellent quality allows the use of reduced emulsifier levels. Their extreme versatility makes pos-

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EMCOL	DESCRIPTION
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H-710	Manufactured for use with 2,4-D and 2,4,5-T ester concentrates, at low levels, these products give low-foam concentrates outstanding emulsification and sludge-inhibiting properties.
H-712	
H-714	
H-140	Especially developed for use with Malathion, these Emcols may be blended with other Witco emulsifiers or used alone. H-140 produces excellent emulsifiable concentrates containing 5 pounds per gallon of Malathion (approx. 60% Malathion by weight). Emcol H-141 is recommended where levels of 8 pounds per gallon (approx. 86% Malathion by weight) are desired.
H-A	
H-B	
H-C	These unique Emcols make practical simultaneous application of a wide variety of liquid fertilizers—liquid pesticide mixtures. Such mixtures may be field-blended to give exactly the correct proportions of toxicant and fertilizer as well as correct dosages for particular crops.

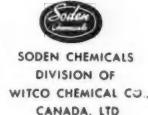


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WASHINGTON VIEWPOINT

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- *Panel of "scientific bluebloods" suggests that carcinogenic chemicals which do not result in residues in marketed food should be cleared for use in food production.*
- *Farmer coops put on notice that they, too, are liable to antitrust prosecution.*

Deflation of cancerscare. The President's high-level Science Advisory Committee has done more in a few short words to get the cancer-from-chemicals issue into perspective than almost anything that's been done since last Thanksgiving's cranberry cancer scare. The committee had appointed a scientific blueblood panel of experts to evaluate the probable extent of human cancer induction through intake of dietary levels of chemicals used in or on foods. What the panel concluded and recommended amounts not only to a vote of confidence in the research programs of the chemical industry but should amount to considerable reassurance for consumers.

Vindication of no-residue use. The panel suggests, although it does not say so flatly, that carcinogenic chemicals which do not result in residues in marketed food should be cleared for use in agricultural production. If Congress follows through on this idea, it would open the way for other suspected carcinogenic chemicals besides stilbestrol and some arsenicals to be marketed in agriculture. Clearance of such additional chemicals, of course, would be predicated on the usual scientific evidence of practicality and safety.

Panel goes even farther. Through an adroit selection of facts and examples in the report, the panel strongly suggests that it would be safe to permit traces of some possibly carcinogenic substances in the food supply. But while this group of scientists believes that some traces would be harmless—Congress is not likely to approve this approach at this time. It is a possibility for the future, however.

The build-up for permitting traces was made by use of the following specific examples and suggestions in the report:

► Simply because a laboratory animal can get cancer from a chemical does not automatically mean that the same chemical can or will produce cancer in man at dietary levels.

► There are levels of intake of some carcinogens at which no cancer is produced in laboratory animals.

► People consume trace elements of acceptable carcinogens like inorganic arsenic compounds, radium and selenium through such things as table salt, etc.

► "The recognition of chemically induced cancer in man is based on circumstantial evidence."

► It depends upon how much of a particular chemical you absorb as to whether you get cancer.

► Also points out that all tumors developed in laboratory animals through chemical diets are not malignant.

The "hard" recommendations made center on the use of the "rule of reason" which is expostulated by the Supreme Court in Rathburn vs. U. S. Chief Justice Warren handed down the opinion which stated significantly: "Every statute must be interpreted in the light of reason and common understanding to reach the results intended by the legislature."

Specific application of the "rule of reason" in the chemical-carcinogen issue, according to the panel, is to evaluate each application of suspected carcinogenic chemical for use in food production in the light of all available scientific evidence—plus the determination of a panel of experts. Thus, the panel recommends creation of a chemical advisory board to make final recommendation on applications to the Department of Health, Education and Welfare. The panel says there is not enough scientific evidence on most chemicals—and it's frequently impossible to develop by present tests—to permit an accurate evaluation of whether a chemical can cause cancer in man at low dietary levels. Hence, it is necessary to use the rule of reason—the best scientific judgment available.

Change in Delaney amendment. The panel says that if the current law does not permit application of the rule of reason, it should be changed to permit it. HEW Secretary Flemming's interpretation of the law is that it does not permit scientific or administrative discretion such as recommended by the panel. He says that it specifically bans the use of suspected carcinogens from use in food production (except for those approved before the Delaney amendment became law).

Will the Delaney amendment be changed? Congress is preparing to debate and vote on the issue. Chances are that the clause will be changed, even though Flemming is expected to stick to his guns—that is, hold out for no loosening of the amendment. The change is likely to authorize the use of suspected carcinogenic substances in food production provided no residues come through in the food supply. Thus, it is not likely to go the whole way as suggested by the panel. Furthermore, Congress may set up a board of experts to help the Food & Drug Administration keep abreast of scientific advances which may have a bearing on the use of such chemicals.

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Phosphorus and Compounds of Phosphorus



What's Coming Next Month

WASHINGTON VIEWPOINT

What does the age of 65 mean to you? Retirement? More golf? Frolicking with the grandchildren? Or visiting all those places you've always read about and wished to see? One thing is for sure: people just can't stand the pace at the age of 65 that they took in stride in their prime.

But not so with publications. Do you know that next month we will be celebrating our 66th anniversary? In July 1894, THE AMERICAN FERTILIZER, aware of the need for communication within the fertilizer industry, published its first issue.

New life was administered to FARM CHEMICALS with the January 1959 issue when we adopted our new editorial approach. Watch for these articles next month as we continue stressing the *profitable* marketing of farm chemicals.

■ LEAKY SALES TALK

A sales talk is like anything else that is susceptible to wear and tear, corrosion, and other elements. Preventive maintenance is the best solution. If your sales talk has sprung a leak you may benefit from some of the ideas that our "Salesense" author suggests next month.

■ TOO LARGE FOR CASH SALES

The farm chemicals industry is getting too big to operate by the standards of yesteryear—i.e. to operate on cash sales. F. E. Hartzler, who this month shows us the way to ease the credit strain, suggests that a method of financial reporting be established for credit in the fertilizer industry. He admits it will take time but to obtain credit from distant money markets farmers must keep organized records.

... in the new

FARM CHEMICALS

BPA

been put on notice they are as liable to antitrust prosecution as other business is. Justice Department trust-busters view monopoly practices of co-ops in the same light as other business monopolies—and have a powerful new weapon to back them up. The weapon comes in the form of a new Supreme Court ruling involving the Maryland-Virginia Milk Producers Association—a ruling which affects all cooperatives.

The High Court said that co-ops are not exempt from antitrust action by virtue of the Capper-Volstead Act—magna carta of the cooperative movement—when they buy or combine with marketing agencies if such moves tend to limit competition. While this has been suspected, it's only now that it has been nailed down for sure. While the mere buying or combining with marketing facilities makes them suspect under antitrust laws, co-ops may still build or develop their own marketing facilities without particular fear of antitrust violation.

Treble damage suits. One of the significant effects of the ruling is that it makes it relatively easier for businesses damaged by cooperative activity to sue co-ops for treble damages. Prior to the ruling, attorneys generally advised businesses so injured to wait until the government proved anti-trust violation of a cooperative before attempting to recover damages. Since this was infrequent and because many thought cooperatives immune from antitrust action, such suits were rare. But with the co-ops in general now specifically brought under monopoly regulation, it is not necessary to await specific government action before damage suits are brought.

Other effects: The Supreme Court also hinted that it considers price-fixing or division of territory between co-ops as possible grounds for anti-monopoly regulation. The ruling, moreover, is not limited to future action of co-ops, but applies as well to past activities.

Fertilizer prices, supplies. The Agriculture Department reports that prices paid by farmers for fertilizer have "changed little" from the spring of 1959. They remain at about 6% above the 1947-49 average—up less than any other group of off-farm produced farm production items. Total supplies of fertilizer materials are expected to be 5.2% above last year.

Pesticide prices, supplies. USDA's summary of the pesticide situation this spring shows that manufacturers' prices of several pesticidal chemicals were reduced in recent months—while few increases have been noted since last summer. Materials quoted at lower prices include benzene hexachloride, endrin, lindane, and rotenone. USDA says that so far as these reductions in manufacturers' prices are reflected in retail prices, they followed the lead taken by prices of organic phosphate insecticides during 1959.

Late spring has delayed shipments—and supplies are expected to be sufficient, although distribution may not be adequate to meet sudden heavy outbreaks of insects and plant diseases or rapid shifts in users' preferences. Upward use trend to continue.



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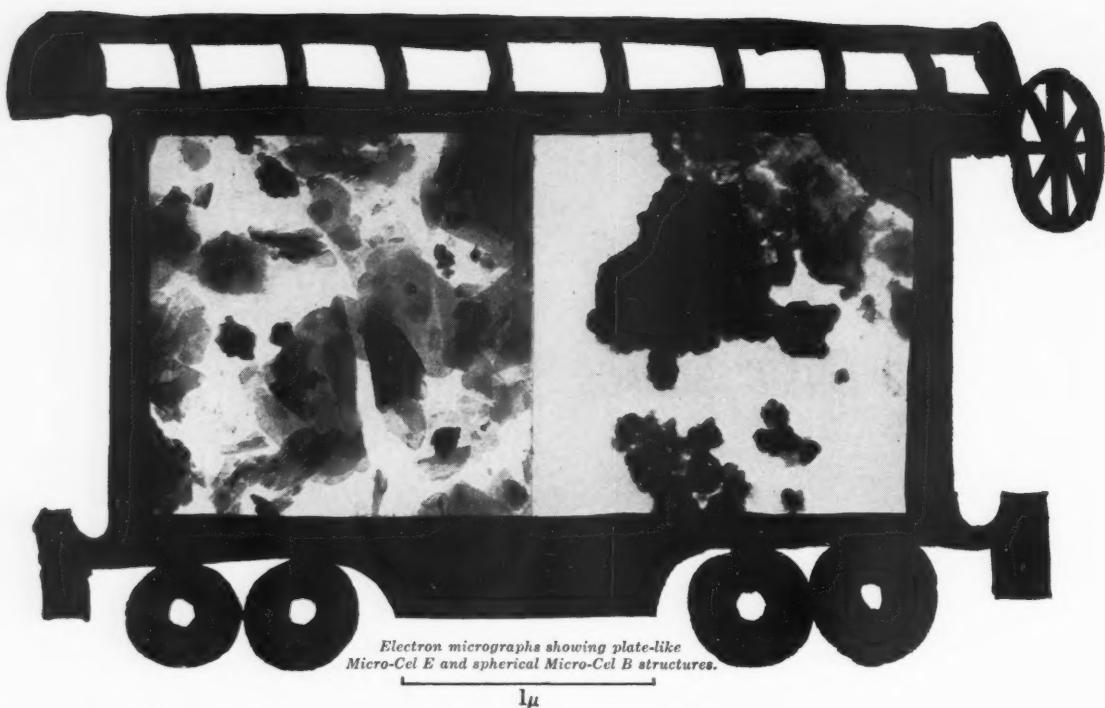


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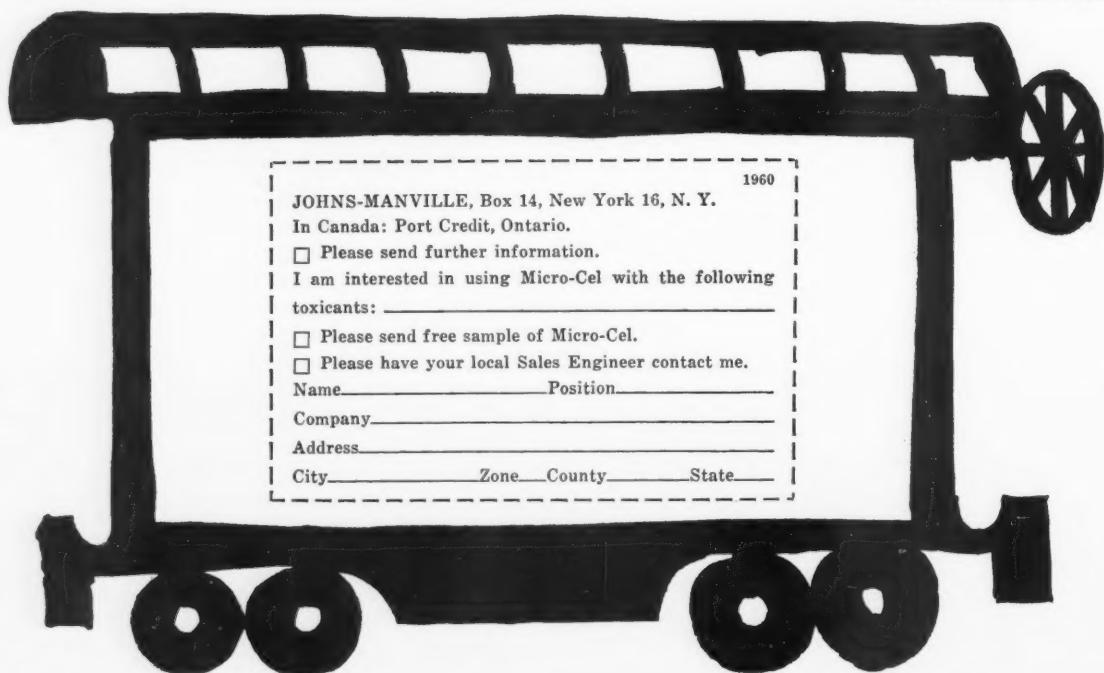




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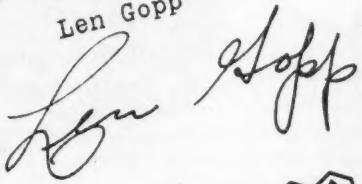
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TO: all department heads
FROM: L. W. Gopp

We have just completed one of the best years in the history of our company. Sales are well over our previous record highs -- as are contracts for the coming year.

This vote of confidence calls for a sincere and tangible sign of appreciation on our part to the industry at large. I want all of our people -- without exception -- to evidence this appreciation by keeping the customer's interest foremost in mind, and by a constant search for new ways in which we can be helpful.

Len Gopp



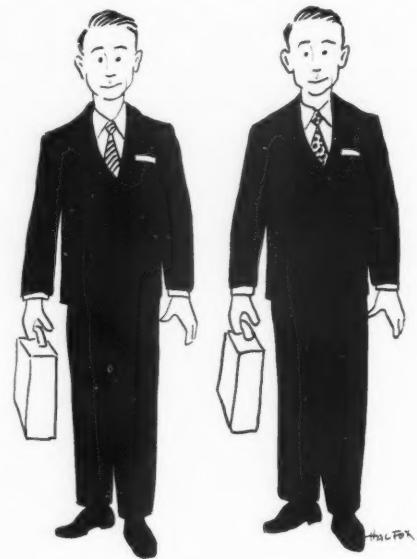
AGRICULTURAL CHEMICALS DIVISION
INTERNATIONAL MINERALS & CHEMICAL CORPORATION 

TAT

OUT

MARKETING

The second in FC's Salesense series points out that salesmen may look alike but between the pro and the struggling amateur



KNOWLEDGE makes the difference!

S ALES MEN may look alike . . . talk alike . . . sell similar products to similar customers . . . yet . . . records prove that less than 20% of these men sell nearly 80% of the total products sold, and the rest have trouble selling enough to hold their jobs.

Stripped of fanciful theory and involved explanations . . . the difference between these men is simply that the top 20% are professional salesmen . . . the rest little more than struggling amateurs. What's the difference between professional and amateur?

Knowledge!

The professional salesman appeals to his prospect's feelings, motives, and desires . . . this he could not do, had he no previous knowledge of his prospect.

A sales manager discussing one of his salesmen said, "He would be a top salesman if he could handle objections."

"Why do you suppose he has trouble answering objections?" I asked.

"He doesn't know enough about his product," he answered.

I talked with another sales manager who said, "In order for your sales talk to be pertinent, clear, accurate and effective, you need more than a good product. You need a thorough knowledge of your product and prospect. The professional salesman has the knowledge; the amateur doesn't."

A professional salesman is one who knows what to do and what to say and how to do it and how to say it under every conceivable situation.

The farm chemicals industry has its own specialized sales situation. The finest book or lecture on sales training could at best only touch on the broad aspects of selling farm chemicals. Many firms seek to fill this vacuum of sales ability with meetings, product literature, field supervision and company operated sales training programs. Yet these same companies

are ready to admit that even with the most determined effort, their training programs have fallen short of the need.

Let's talk about *knowledges* as they apply to the salesman. Our organization has been faced with this problem numerous times. Many companies we have served have little or no training program, and we start from scratch. Those with extensive programs require less effort on our part, but we are continually amazed at the lack of specific knowledge concerning so many matters we have found essential to the mental repertoire of the professional salesman. And more often than not, this lack of knowledge is found in organizations proud of their sales training.

Do we distinguish between training men in technical and detailed matters and training them in selling skills? The answer must lie in specifics. What are details? What is technical?

SOME OF THE ESSENTIALS

The list of required knowledges on the part of the professional salesman would serve no useful purpose here, for you would not read it, but may we quote from the list a few of the essentials, in our opinion:

The successful salesman—the *professional* salesman—knows his company policies, background, history and officers. He is well acquainted with the present and future market trends, competitors' actions and prices. He can discuss manuals, catalogues and production methods. Credit terms, procedures and requirements are not foreign to him. He knows why farmers hate to make a change in the companies they do business with, and why they hate to make a choice. He recognizes signals of satisfaction from the farmer, and knows every objection the farmer might raise. He has made a list of every conceivable situation in which he might find the farmer, and the decisions the farmer must make before he does business with any company. He is well informed on methods of organ-

izing his time, and knows all the principles of getting along with all people, especially farmers.

These knowledges *must* be a part of the sales kit of the professional, and they take up no room in the briefcase, only in the gray matter of the brain. Without such information, selling skill means nothing. For how can you train a salesman to speak the language of the farmer when he doesn't know the language? You can't ask him to fit his product to the farmer's need when the salesman doesn't know the difference between a silo and a sow.

A company president in Kansas City, Kansas, told me the thing that caused his stomach muscles to pucker with nauseating pain was for one of his salesmen to be asked a question about his product or service and not know the answer. He said the only excuse for this lack of knowledge is laziness.

In every selling situation, i.e., a situation in which the salesman, is face to face with a prospect or customer, there are three essential elements present . . . the salesman, the customer and the product being sold. Which of the three is more important?

There can be only one answer—the customer!

UNDERSTAND HOW PEOPLE BUY

The professional salesman is a personal salesman. He approaches each customer or prospect according to that individual's own needs, habits and problems. To do so, he must have certain facts about the customer, his business, habits and customs. We shall explore in this article CUSTOMER KNOWLEDGE (Prospect Knowledge) and PRODUCT KNOWLEDGE.

Why study the customer? Because this is the only sound basis for closing the sale satisfactorily, and because you can then treat the customer the way he wants to be treated. Furthermore, you cannot plan your presentation, or even your approach, unless and until you know the customer.

Study the customer. You are not the first salesman to call on him, and won't be the last. He has set up a standard of treatment which he expects from salesmen. This standard relates both to personal and business relationships. If you don't know him and the standards he has set for *you*, don't call on him. Your time is too valuable to be thrown out simply because you did not know what to expect.

This is the reason salesmen realize the importance of studying the personality traits of different kinds of people and understanding the reasons they act the way they do. Selling demands that the "self-important" buyer be treated differently from the "suspicious" buyer. The successful salesman knows that the "clam" requires a different technique from the "talkative."

Prospect knowledge tells us *how* to talk to the prospect. Another kind of prospect knowledge tells us *what* to say when we are talking to him.

This type knowledge answers the following questions for the salesman:

The buyer's name—can he make a decision?

Number of acres under cultivation, type crop, type fertilizer in use now, his present yield per acre, has he had his soil tested?

Type land, type of equipment in use now, who is present supplier and is he satisfied with present supplier?

Is he a land-owner or does he rent?

Rate of application, credit rating, how much labor?

Caliber of labor, his bank, his hobbies, and the best time of day, month and year to call on him; his children and their ages.

What are his long term goals and aims?

A salesman once told me, "If a farmer or prospect has a *need* and my product or service will fill that *need*, I will sell him." He said he never worries about the price-minded prospect, because he always knows before he calls on a prospect whether there is a need and whether his product or service will fill that need.

Another salesman once used this approach to his sorrow.

"Mr. Farmer, if I could show you how you can increase your yield 25% you'd at least want to see it, wouldn't you?"

"I sure would. Can you do that for me?" asked the farmer.

The salesman said, "We sure can."

"That's mighty interesting," the farmer said, "but first let me ask you this."

"Fire away; ask me anything," said the salesman.

"How much yield am I getting now?" the farmer asked.

The salesman almost dropped his teeth, and finally murmured, "I don't know."

"Then how in the thunder do you know you can increase it 25%?"

This interview was terminated . . . and rightly so . . . because this salesman had not done his homework. He was using an attention-getter that he had probably found in a sales book.

What he didn't have was Prospect Knowledge that would support his attention getter!

WHERE TO FIND THE INFORMATION

Up until now, we have discussed what the chemical fertilizer salesman needs to know about his prospect before he calls on him. Now, where can this information be obtained? You might start with his banker or an employee. Others are: His employer, non-competitive salesmen, vocational agricultural teacher, grain elevator superintendent, county court clerk, livestock dealer, real estate agency, implement dealer, gin superintendent, sales barn, county agent, neighbor, friend, bulk oil dealer, seed dealer, tax assessor, grain buyers, groceryman, relatives and from the prospect himself.

The most costly and universal mistake made by salesmen today is this: Salesmen are selling comparative facts and features about their products and services. Unfortunately, buyers today are not buying comparative facts and features, and very few of them are buying comparative benefits. In most cases, they have heard all the comparative benefits stressed by your competitor, but they have not heard your exclusive benefits, because your competitor cannot sell your patented benefits.

Before a farmer buys anything, he wants answers

MARKETING

KNOWLEDGE makes the difference!

(Continued from page 19)

to most of the following questions: What is it? Who makes it? What does it do? What will it mean to me? Who says so? Can you prove it? How much does it cost? Is it guaranteed?

Now, you might leave one or two of the above questions unanswered, and you might close a sale, as long as you are absolutely certain it is not the question, "What will it mean to me?" How can you make certain you have the answers to the above questions? Simple . . . Know everything there is to know about your product and service.

FACTS AND BENEFITS

Every fact, feature, benefit, different facts, and different benefits come from Product Knowledge. The facts about our product only places us in a position to sell the real benefit. A fact is what a thing is, and a benefit is what a thing does.

For example, some facts about anhydrous ammonia are: It is 82% nitrogen, leach resistant, liquid under pressure, applied deep, and will mix with water. Not too many farmers will buy these facts. Some of them might not know what they mean, and care less. But he will care if you connect the fact to a benefit, by telling him what it will mean to him.

For instance: "Mr. Farmer, this anhydrous ammonia is 82% nitrogen. Now here is what that is going to mean to you. It means less bulk to handle.

Salesman's Check List

- ✓ Know your company policies, background, history and officers.
- ✓ Know present and future market trends, competitors' actions and prices.
- ✓ Know how to discuss manuals, catalogs and production methods.
- ✓ Know all the principles of getting along with people.
- ✓ Know how your product will directly benefit your customer.

It means less labor and less cost, giving you more net profit."

Let's take one more. "It is leach resistant. Now here is how being leach resistant will save you time and money, and give you peace of mind. You can put it down in the off-season when your labor is not too busy, and not have to worry about its washing away."

If you were a farmer, which would you buy . . . the fact or the benefit? Another very good question for you to ask yourself every time you present a sales point is, "If I were in my prospect's shoes, would I buy this?"

Based on his knowledge of the customer, the salesman can now sell those benefits which fit that customer best. If he is an elderly farmer, or not physically strong, then heavy emphasis should be put on the convenience and labor-saving benefits from anhydrous ammonia.

With a little Pre-Approach, the chemical salesman can increase his sales and commission by combining Prospect Knowledge and Product Knowledge.

I heard a salesman once tell his sales manager, "If I didn't have to lose so much time on Pre-Approaching my prospect before calling, I would make a lot more sales, and be a lot better salesman."

The sales manager said, "You wouldn't make as many sales. You wouldn't even be a salesman. You would be an order-taker."

There is only one source for the kind of knowledge which will permit the salesman to present these benefits, together with their supporting facts, to the customer. That source is Product Knowledge.

In summary, let's look at some of the ways knowing your product and prospect will benefit you.

PRODUCT KNOWLEDGE

It is the greatest known way to build enthusiasm. Builds self-confidence. Prevents salesman from exaggerating and making wild claims. Makes it easier to stress more selling points about your product. Reduces fear of the objection. Cuts down superlatives. Reduces word whiskers. Helps you talk more fluently and conversationally. Builds prospect's trust and confidence in you. Helps knock the ice out of price.

Knowing your product makes it easier for you to discover new uses for your product.

Knowing your product will cut down on your interview time . . . make your sales presentation more effective . . . which means more sales at less cost per sale.

PROSPECT KNOWLEDGE

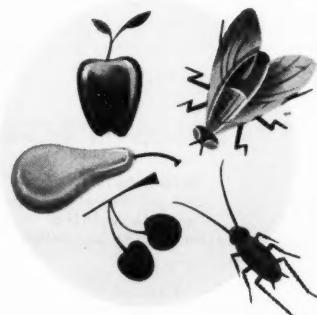
Helps qualify prospect. Eliminates antagonizing prospect. Helps anticipate prospect's objections. Helps you talk in terms of the prospect. Saves embarrassment. Helps guide prospect thinking. Saves you time and money . . . which means more interviews, more sales, and more profit.

So if you want your prospect to say to you, "I am sure glad to see you. Pull up a chair and have a seat. Take off your coat and stay a while," make a study of your product and tell him what it will do for him. ▲

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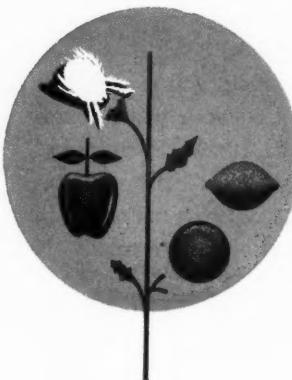


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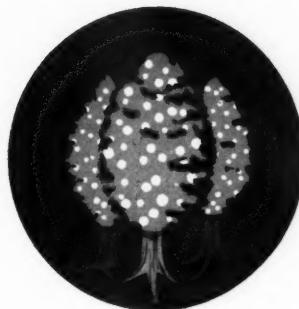
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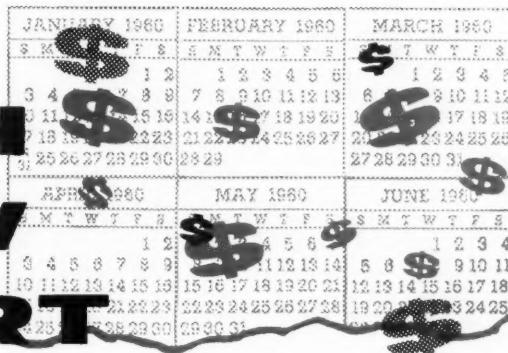
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MARKETING

A CASH FLOW CHART



can ease the credit strain

By F. E. HARTZLER

THE fertilizer industry is facing some tough problems. It is selling in a declining market and to an industry in the middle of a major readjustment. However, an even more difficult problem is the result of too much past agricultural prosperity—that of credit.

Business purchasing is almost universally done on credit, and, today, a tremendous amount of consumer purchases are credit purchases, also. It is estimated that sixty-seven per cent of all consumer purchases are made on credit. Unfortunately, the agricultural market does not fall into the usual pattern. From 1941 to 1951 the farmer made enough money that credit was not much of a problem. As a result the industry did not develop the tremendous credit knowledge and experience that other areas developed. Furthermore, the very nature of farm income makes it difficult to utilize the installment credit methods that suit a wage earner so well.

A cash flow chart for a fictitious dealer will show the problem the industry is facing. In this way, we can illustrate the tremendous amount of credit required and some possible answers.

The cash flow chart which follows reveals the needs of a business for cash during the year. It is made up from three accounts: the sales account, cash account, and the accounts receivable.

Let's start with sales by month:

Month	Sales	Month	Sales
January	—	July	—
February	—	August	—
March	\$40,000	September	\$10,000
April	100,000	October	10,000
May	40,000	November	—
June	—	December	—

However, sales are not necessarily cash in hand.

If this dealer averaged forty per cent cash sales, he could expect cash to come in at the following rate:

Month	Cash In	Month	Cash In
January	—	July	—
February	—	August	—
March	\$16,000	September	\$4,000
April	40,000	October	4,000
May	16,000	November	—
June	—	December	—

Since many farm people pay their bills after the harvests, this cash needs to be considered also. From the accounts receivable ledger it is possible to find this flow of money into the business:

Payments on Account:

January	\$8,000 (Last year's)	July	\$20,000
February	3,000 (Last year's)	August	20,000
March	—	September	40,000
April	—	October	20,000
May	—	November	10,000
June	—	December	10,000
		Unpaid balance	\$10,000

Now, let's make a quick summary:

Total Sales.....	\$200,000
Cash.....	80,000
Credit.....	120,000

Actually this would not be a bad sales pattern for most lines since sixty per cent of the sales were credit.

The expenses will follow this pattern. On \$200,000 dollars worth of sales, we are figuring a cost of goods of eighty per cent; we are figuring a fixed expense of \$2,000 per month, and the other expenses at a pro-rated eight per cent of sales.

Putting all these together into one chart along with expenses, we can see what makes the fertilizer business

MARKETING

so very unusual and difficult. This may also reveal why price cutting is so very prevalent in the industry.

For the sake of example let us assume the dealer had a cash balance of \$8,000 on hand in January. From this we can start plotting his needs.

CASH FLOW CHART

Month	In	Out	Gain	Loss	Bal.
Jan.					\$8,000
Acct. Pd.	\$8,000				
Cash		\$2,000	\$6,000		14,000
Feb.					
Acct. Pd.	3,000	2,000	1,000		15,000
Cash					
March					
Cash	16,000	37,200		\$21,200	- 6,200
April					
Cash	40,000	90,000		50,000	- 56,200
May					
Cash	16,000	37,200		21,200	- 77,400
June					
Cash		2,000		2,000	- 79,400
July					
Acct. Pd.	20,000	2,000	18,000		- 61,400
Cash					
Aug.					
Acct. Pd.	20,000	2,000	18,000		- 43,400
Cash					
Sept.					
Acct. Pd.	20,000	4,000	10,800	13,200	- 30,200
Cash					
Oct.					
Acct. Pd.	40,000	4,000	10,800	33,200	3,000
Cash					
Nov.					
Acct. Pd.	10,000		2,000	8,000	11,000
Cash					
Dec.					
Acct. Pd.	10,000	2,000	8,000		19,000
Cash					
Unpaid accounts					\$10,000

In order to explain the more complicated entries let's take March for consideration. During that month we have sales of \$40,000 of which forty per cent is cash. This gives us \$16,000 cash. Under expenses we have:

Fixed Expense.....	\$2,000
Direct expense pro-rated	
8% of \$40,000.....	3,200
Cost of goods sold at	
8% of sales.....	32,000
Total.....	\$37,200

In short, in order to do \$200,000 sales in the old sales pattern the dealer will need credit amounting to \$79,200 plus, probably, a margin of \$5,000, or about \$84,200 in all. This is a lot of credit in a short time.

To fully understand just how unusual this credit situation is, let's take a more balanced industry with an even sales pattern. Using the same sales total, the same fixed expense ratio, and the same pro-rated other expenses, we can make up a quick cash flow chart. The sales pattern, of course, will be different:

Month	Sales	Month	Sales
January	\$12,000	July	\$12,000
February	10,000	August	12,000
March	12,000	September	20,000
April	18,000	October	20,000
May	18,000	November	22,000
June	16,000	December	24,000

This credit is thirty-day open account, and our store owner has the same \$8,000 cash on hand.

CASH FLOW CHART FOR A STEADY BUSINESS

Month	In	Out	Gain	Loss	Bal.
Jan.					\$8,000
Acct. Pd.	\$14,400				
Cash	4,800	\$12,560	\$6,640		14,640
Feb.					
Acct. Pd.	7,200				
Cash	4,000	10,800	400		15,040
March					
Acct. Pd.	6,000				
Cash	4,800	12,560			\$1,760 13,280
April					
Acct. Pd.	7,200				
Cash	6,200	17,840			4,440 8,840
May					
Acct. Pd.	10,800				
Cash	6,200	17,840			840 8,000
June					
Acct. Pd.	10,800				
Cash	6,400	16,080	1,120		9,120

There is not much to be gained from belaboring the point. There is very little possibility that this man will have to go to the bank to borrow money. His own \$8,000 will probably carry him. He could, of course, get into trouble in inventory by careless handling of credit, but he is in far better shape than is the highly seasonal fertilizer dealer.

Few, if any, dealers will be able to handle the kind of credit needed in the fertilizer business. They are, of necessity, going to have to go to the finance company, the bank or to the supplier. In securing the kind of credit they need they should make out a cash flow chart to present to any lending institution. It will enable them to secure credit that might otherwise be impossible to get.

It is also doubtful if very many dealers will be able to make out such a chart. The best source of help may be the credit manager of the manufacturer. As a matter of fact such charts would help him in establishing credit limits for each dealer. The manufacturer's salesman might be another source of help.

While the figures used in this example were fictitious, I believe that they tend to point out the inherent danger of any seasonal business. One can also see why a business with strong allied lines, that would give an evener flow of cash in, might have a tremendous advantage.

There is, of course, the alternative of selling only for cash. This would probably reduce sales greatly; in fact, it is almost sure to do this. So the problems of the industry remain just what they always have been. However, through the use of a tool such as the cash flow chart, one can start looking for ways to ease the strain. ▲

ELEMENTARY...



THAT'S WHY IT DIDN'T BREAK!



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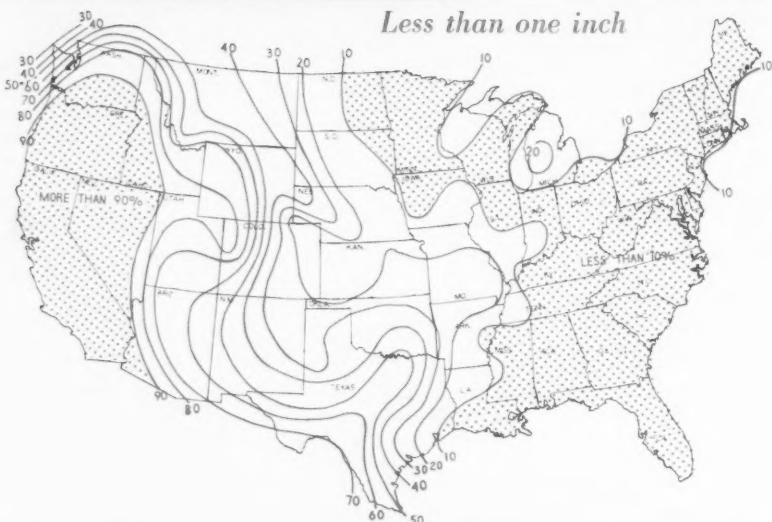


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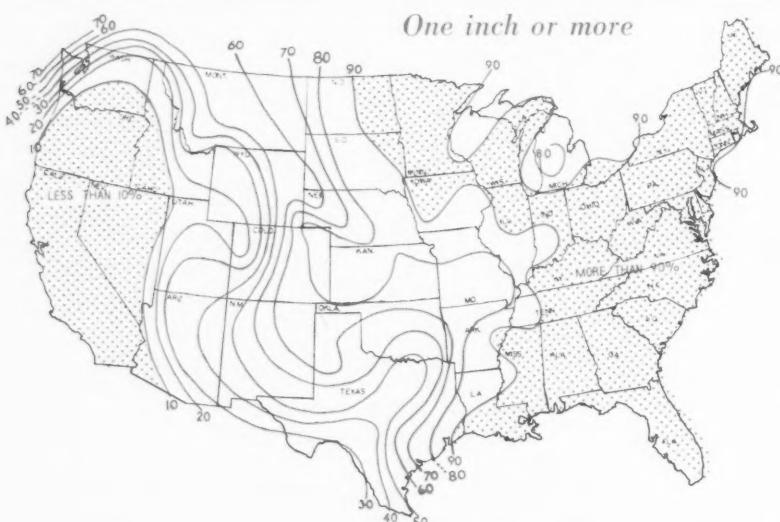
july RAINFALL

% Probability

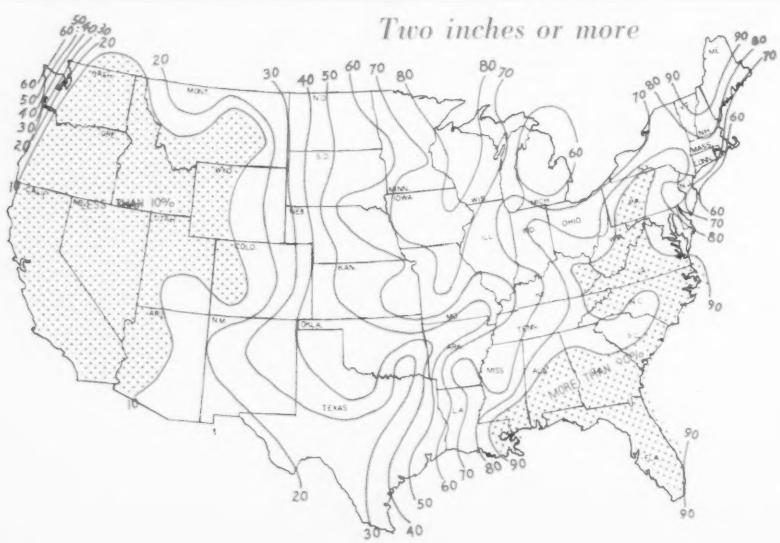
Less than one inch



One inch or more



Two inches or more



**Use this
FC weather
service as a
sales aid**

By VAUGHN HAVENS

THE accompanying set of maps indicates the chances of receiving various amounts of rainfall in July. The lines drawn on the maps are labeled in % probability which is easily converted into odds or the risk of a certain event occurring or not. 80% probability means that the likelihood of occurrence of an event is 80 chances out of 100, or 8 times in 10.

The information given by the maps is not a conventional "weather forecast." Although forecasts for a month or more are often attempted, at present their accuracy is quite limited. Furthermore, if such a forecast is used for planning purposes it may do more harm than good, because the user has no way of knowing how much confidence he can place in the forecast.

The probabilities presented on these maps are illustrations of the use of past weather records in order to estimate future weather risks. In all but a few instances the period of record used extended from 1928 through 1957.

How to use the maps

If your plans for July will be adversely affected if the month should bring 5 inches or more of rain, and you happen to be located in northwestern Florida, then look out—the 5-inch map shows that the odds are 8 to 2 against you and in favor of 5 inches or more of July rainfall. On the other hand, if you are located in central South Dakota, there is less than 1 chance in 10 of July bringing you 5 inches or more rainfall.

If you live anywhere east of the

FARM CHEMICALS

% Probability

july
RAINFALL

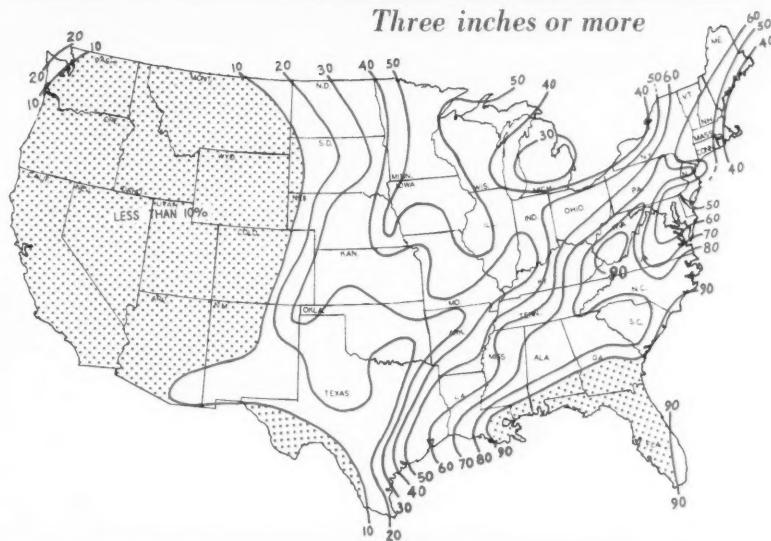
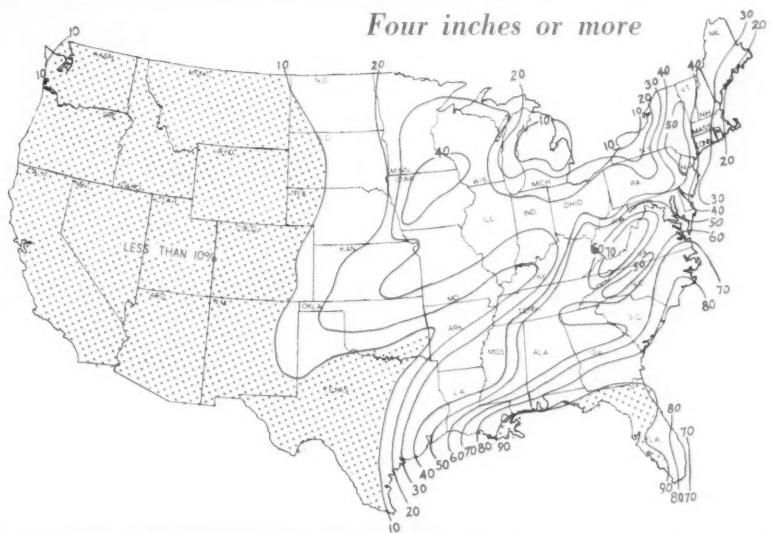
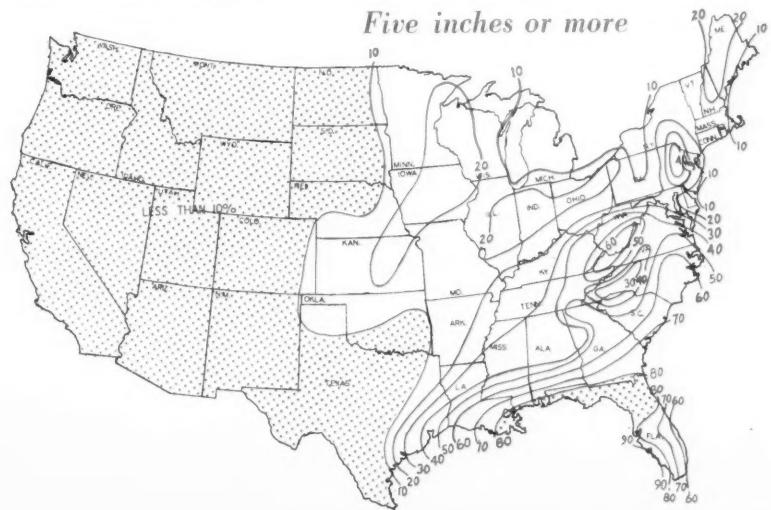
Mississippi, there is only one chance in ten of your area receiving so little rainfall—actually less than 1 in 10 over most of the specified region, about 1 in 10 along the New England coast and about 1 or 2 chances in 10 around the Great Lakes. You can be pretty sure (over 90% or more than 9 chances out of 10) of receiving less than one inch during July, however, if your area is in California or Nevada.

In an area completely encircled by one of the probability lines, all locations within the area have a rainfall probability somewhat higher than the value given for the line, if the next line has a lower value. For example, on the map of 3-inch rainfall, the area in West Virginia is enclosed by the 90% line; the next line is marked 80%. Accordingly, locations inside the West Virginia loop have slightly more than 90%, or a little better than odds of 9 to 1, in favor of receiving 3 inches of rain in July.

Locations inside an area enclosed by one of the lines have a rainfall probability somewhat less than the value given for the line, if the next line has a higher value. There is a good illustration of this on the same 3-inch map. Most of the lower Michigan peninsula is encircled by a 30% line, and the next line is 40%, so that the odds of receiving 3 inches of rain are slightly less than 3 in 10 within the area indicated.

How the maps are prepared

Thirty years of July rainfall for about 200 Weather Bureau stations over the country, amounting to over 6000 pieces of information, were compiled and analyzed in order to draw these maps. The maps should be used with caution in mountainous terrain, since differences in elevation and exposure to the prevailing winds can cause large difference in rainfall between nearby locations and alter the probabilities greatly. An interesting large-scale feature of the maps is the importance of the Gulf of Mexico as a source for rainfall carried northward into the eastern half of the nation, with generally decreasing probabilities for any of the rainfall amounts as the distance from the Gulf increases.

*Three inches or more**Four inches or more*



NPFI at the Greenbrier

SPEAKERS from agriculture, education, business, and industry will be featured at the 1960 convention of the National Plant Food Institute, at The Greenbrier, White Sulphur Springs, W. Va., June 12-15, Paul T. Truitt, president of the Institute, has announced.

Richard E. Bennett of Omaha, Neb., chairman of the Board of Directors of the Institute, will preside at the sessions which begin with a morning program on Monday, June 13.

The morning program for June 13 follows: Mr. Bennett, Address of Welcome; Dr. Clifford M. Hardin, chancellor of the University of Nebraska and president of the American Association of Land-Grant Colleges and State Universities; Jim Thomas of Patterson, Ga., president of the Future Farmers of America on "A Future Farmer Looks at His Future in Agriculture"; Arthur H. Motley, president of the Chamber of Commerce of the United States, on "The Political Responsibility of the Business Community," and the annual business meeting of the Institute will follow. A special Ladies Program will feature an illustrated talk by Miss Betty Fisk, Drexel, N. C., director of publicity for the Drexel Furniture Company on "We Return to Elegance in Home Decoration."

The afternoon program for June 13 will be on the subject of the Institute's "Chemical Control Project" with Dr. Vincent Sauchelli, chemical technologist for the Institute, as moderator. Other participants are Edwin M. Glocker, W. R. Grace & Co., Washington Research Center; Stacy B. Randle, president of

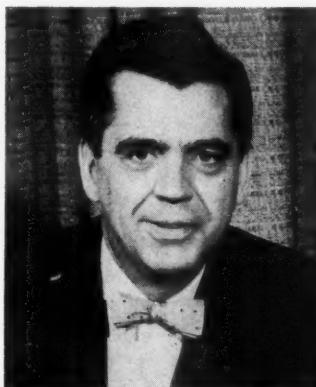
the Association of American Fertilizer Control Officials, New Brunswick, N. J.; C. H. Russell, St. Louis, Monsanto Chemical Co.; Jim R. Archer, East Point, Ga., International Minerals & Chemical Corp.; Dale C. Kieffer, Norfolk, Va., Smith-Douglass Co., Inc.; Albert Spillman, Baltimore, Md., Fertilizer Manufacturing Cooperative, Inc.

The morning program for the second day of the convention, June 14 follows: Showing of the Institute's new film, "Bread from Stone"; presentation of scrolls to winners in "Soil Management Awards for Editors" contest by Mr. Bennett; Drs. George M. Beal and J. M. Bohlen, Department of Rural Sociology, Iowa State University speaking on "Dealer Characteristics Survey"; Murray Rennick, Rolla, Mo., Rolla Feed Mills on "What a Dealer Should Know"; Ralph Everett, Miami, Fla., sales training consultant, on "Everything Depends on Sales." The annual banquet will be held in the evening.

Committee Chairmen for the convention will be: Memorial, Hugo Riemer, Los Angeles; Hospitality, Mr. & Mrs. William M. Cline, Los Angeles; Ladies', Mrs. J. D. Stewart, Jr., Anchorage, Ky.; Men's Golf, W. R. Morgan, New York City; Ladies' Golf and Putting, Mrs. L. Ralph Boynton, Bronxville, N. Y.; Tennis, W. E. Jaqua, Richmond, Calif.; Horseshoe Pitching Contest, A. A. Schultz, Reading, Pa.; Skeet, T. F. Bridgers, Wilson, N. C.; Bridge and Canasta, Mrs. Jack B. Snyder, Topeka, Kans.; Prizes, Mrs. Dean R. Gidney, New York City.

*National Plant Food Institute's fifth annual convention,
June 12-15, includes discussion of the Chemical Control
Project, what dealers should know, and a recent survey.*

Dr. Clifford M. Hardin
Chancellor,
University of Nebraska
and President,
American Assn. of Land Grant
Colleges and State Universities



Jim Thomas
President
Future Farmers of America



Arthur H. Motley
President
Chamber of Commerce
of the United States



Dr. George M. Beal
Department of Rural Sociology
Iowa State University



Dr. J. M. Bohlen
Department of Rural Sociology
Iowa State University

Ralph Everett
Sales Training Consultant



Murray Rennick
Rolla Feed Mills





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New Delhi, India
Secunderabad, India
Teheran, Iran
Florence, Italy
Tokyo, Japan
Seoul, Korea
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MARKETING



Panel discusses trends, objectives and problems. Its purpose:

ONE WAY TO GET ideas is the "brainstorming" technique where a group of people get together and contribute as many ideas as possible. This is happening in the fertilizer industry where, in one year, a Customer Advisory Panel has established itself as an industry institution.

A cross-section of leadership in the fertilizer industry meets twice a year with top management of International Minerals & Chemicals Corporation to discuss trends, objectives, and problems of the industry.

The IMC Customer Advisory Panel met recently at IMC's Administrative and Research Center at Skokie, Illinois. This was the third such meeting of the industry leaders who participate on a rotating basis, with two new members at each succeeding meeting.

One of the primary purposes of the panel is to learn how IMC, as a supplier, can better serve the industry. The opinions of the panel have had a great deal of influence on many of IMC's management decisions.

IMC has found that the Panel resulted in better communications and a new concept in customer service to the benefit of both customer and supplier.

Some of the major problems that were discussed include such items as net farm income, pricing, credit and the influence of weather. Among the areas of greatest potential are cotton and pastures. One member stated that he had been advocating grassland fertilization for 20 years with little success; however, he emphasized that this was still our greatest potential. Grass fertilization seemed to be the area most members emphasized. Comments by the panel appear on the following pages.

To
better
serve
the
industry

VIEWS from a cross section of industry leaders

AVAILABLE MONEY TO "WHEELS" . . . Richard Bennett, president, Farm Fertilizers, Inc., Omaha, Nebraska.

Area: Western Iowa and Eastern Nebraska

Net farm income was down 28 per cent in Nebraska, a serious problem . . . 25 per cent in Iowa. Available money will go to tractors, farm machinery and automobiles. We are having a late spring . . . sales behind last year. Farmers are more aware of the value of fertilizer.



COLLECTIONS ON CREDIT

. . . ONLY FAIR . . . Alex Mooney, general sales manager, Canada Packers Ltd., Toronto, Canada.

Area: Eastern Canada

Potato prices high . . . \$5.35 bl. higher than previous years. We anticipate 5-7 per cent increase in fertilizer consumption. Strong competition in Ontario for 460,000 tons used. A short season will strain the ability to produce enough fertilizer.



SPRING . . . UNCERTAIN . . .

Edward Kingsbury, vice president, Kingsbury & Co., Inc., Indianapolis, Indiana.

Area: Indiana

Snow will delay field work. Be hard pressed to supply the needed fertilizer. Some companies operate on the theory lose a little on each ton . . . gain with volume. Hog-corn ratio important in Indiana. Price situation bad.

SALESMANSHIP POLICY FOR SALVATION . . . Laney G. Black, president, Ark-Mo Plant Food Co., Inc., Corn-ing, Arkansas.

Area: NE Arkansas—SE Missouri

Fertilizer sales good last year . . . this year weather principal factor. Ground has good moisture . . . I look for an excellent crop year. With a late, short season . . . demand is there, doubt if it can be supplied fast enough. Freight rates are down 12 per cent from '50. Fertilizer industry makes least money, has greatest potential. "We should formulate a salesmanship policy for salvation."



GREATEST POTENTIAL . . . FERTILIZATION OF GRASS . . .

John C. Crissey, division manager, Soil Building Service, GLF Exchange, Ithaca, New York.

Area: New Jersey, New York, No. Pennsylvania

The planting outlook: oats . . . depends on weather; corn . . . slight increase; potato increase in Maine, Long Island and upper New York. Farmers are quitting tomatoes; can't get yields . . . prices. Increases in specialization . . . for frozen foods. Grass fertilization has greatest potential. Credit problems are increasing. "Serve the big farm operators . . . protect ourselves."



USE OF HIGHER ANALYSIS FERTILIZER . . . UP! . . . Arthur R. Mullin, manager, Fertilizer Department, Indiana Farm Bureau Cooperative Assn., Inc., Indianapolis, Indiana.

Area: Indiana

Before the snow . . . sales were expected to be up about 5 per cent. Soil bank figures may include marginal and "hobby" farmer. Tomatoes, a heavily fertilized crop, is expected to be down in acres. High analysis fertilizer use is increasing . . . 5-20-20 increased 2.2 per cent over spring of '58; 14-14-14, up 2.3 per cent and 6-24-24 doubled. Trends to bulk fertilizer and bulk blending . . . disturbing.



BIGGEST OPPORTUNITY . . . COTTON, PASTURES . . . T.F. Bridgers, president, Farmers Cotton Oil Co., Wilson, N. C.

Area: North Carolina

Fertilizer consumption . . . July-Dec. '59—175,530 tons compared with 228,000 for corresponding period '58. Is this a trend? Market for tobacco fertilizer near saturation . . . efficiency curve leveling off. Price on 5-10-10, a good indicator, was \$50.75 in '51—\$49.25 in '59.

COMPETITIVE PRICING . . . SEVERE . . . SENSELESS . . . W. Newton Long, chairman, Miller Chemical & Fertilizer Corp., Baltimore, Maryland.

Area: Pennsylvania, New Jersey, West Virginia, Delaware, Maryland and Virginia

Thousands of good acres out of production . . . highways, new developments and soil bank. Outlook this season . . . depends on supports, weather and selling price. Competitive pricing in the fertilizer industry is severe and senseless. Bad debt problem . . . only about 1 or 2 per cent worse than last year.



TIGHTEN OUR CREDIT POLICY . . . J. D. Stewart, Jr., president, Federal Chemical Co., Louisville, Kentucky.



Area: Indiana, Kentucky, Illinois, Tennessee, Ohio, Michigan, Upper Alabama and Miss.

Sales outlook optimistic . . . south of Ohio River; north of the river . . . mildly pessimistic. Again, weather will delay shipments . . . limiting factor will be ability to manufacture as fast as we can ship. Collections slowed down 2-3 per cent . . . farmers have less money . . . money tighter. Only recourse . . . tighten our credit policy.

PASTURES . . . GREATEST POTENTIAL . . . W. F. Williamson, president, Louisiana Agricultural Supply Co., Inc., Baton Rouge, La.



Area: Louisiana

Louisiana consumes about 300,000 tons fertilizer annually. Expect sales to be about the same as last year. Cotton had been king . . . messed up politically. Cane farmers . . . best shape financially . . . mineral fertilizers pay off. Pastures offer greatest fertilizer potential . . . industry doesn't seem to be taking advantage of this.

10 OBSTACLES TO SCIENTIFIC MARKETING

THREE is little doubt that American business is marketing conscious. Business has discovered the other side of the coin. Because, today, the problem in America—unlike that of the rest of the world—is that of *managing surpluses*. Many earnest observers believe that our capacity to produce has outstripped our capacity to consume.

To tens of thousands of businessmen, the words "distribution" and "marketing" have been synonymous with "selling." And selling has been looked upon as close to the necessary evil—necessary only because we "had to get rid of what our plant produces."

Production was looked upon as the primary objective of industrial enterprise. "Investment" has meant monies spent on machines, buildings and equipment used in production. Even the earnings on the market (from sales) were adjudged on the basis of "returns on investment"—the investment in the plant and equipment for production. Engineers have been considered as necessary to improve production methods and to secure technological progress as measured by additional units produced, or the amount by which production costs could be reduced.

"Per capita productivity" was and still is a measure of the volume of production. The break-even point is the point where all costs of production are recovered, above which the plant makes money.

CONSUMPTION CAPACITY IS LAGGING

But since 1954, America has had excess productive capacity. And since 1954, according to the studies of the National Industrial Conference Board, we have made little if any economic progress.

Like it or not, the United States today stands virtually at the bottom of the list of major nations in terms of

annual rate of economic growth!

The time has come when our vaunted technological know-how has to be applied to distribution of the goods our productive technology has demonstrated it can turn out. Our *consumption* capacity is lagging. We need *scientific marketing*.

Marketing in the 1960's means profitable customer-making. And the *making of the goods* (production) is only incidental to the main job of profitably getting the goods into the hands of the users who need or want those products. Because until we can distribute scientifically, we can not have consumption on a par with production. What we need in 1960 is not more "per capita productivity," but more, and more scientifically acquired, *per capita consumption*.

THE ROLE OF "THE MARKETING CONCEPT"

Since 1955, management has been attempting to meet this challenge with what has become known as "the marketing concept." Business exists to satisfy a need or want, uncovered or developed, in the market; all business decisions are made in the light of the established needs of the market; products are made, changed, or new ones added in response to a market demand; and business is customer—and not production—oriented.

This has represented a major point of departure in management thinking. It has required that management focus its creative problem-solving on the market instead of on the machine in the plant. Those companies which have gone the furthest along this route are the ones which report the best results in profitable sales, improved management, more and better coordinated, *total team-work*.

But most marketing observers recognize that business still has a long way to go. And these observers see a variety of obstacles in the way, all of which will

Companies which have gone the furthest along the route outlined on these pages are the ones which have reported profitable sales, improved management and teamwork.

require time, patience and effort before they are successfully overcome.

OBSTACLES TO SCIENTIFIC MARKETING

Current thinking summarizes these major obstacles into ten specific categories.

Obstacle No. 1: *Failure of Top Management to accept the basic philosophy behind customer-oriented marketing.*

This is a matter of attitude or viewpoint on the part of top management. In many companies, management has given lip-service to the "new concept," but business has continued as usual. Nurtured in the old tradition of production, many executives continue to look for ways to cut production costs. Management's obsession with production and with the factory concentrates the search for improvement on the factory, the employees in the plant; hence its insistence on "increased productivity."

The sad fact is that in the decade just closed, industrial productivity increased at the average rate of 3.1% per annum, but distribution productivity increased only at the rate of 1% (or slightly less) per annum. Plain arithmetic puts distribution therefore at least 20% behind production. Thus, American industry overall is today geared to produce at *least 20% more* than the public is currently consuming. In some heavy industries, and some consumer durable goods, excess production capacity may well exceed 25% or more. Therefore, increased industrial productivity is not the answer to our economic troubles. Increased *consumptivity* may well be.

Obstacle No. 2: *Failure to develop a generally accepted definition of marketing.*

This means that we lack a working definition of

JUNE, 1960

marketing acceptable to business management; which may indeed be responsible for the lack of implementation noted in (1).

But this lack of agreement is noted also among academicians, business consultants, and marketing people themselves. We have for too long thought of business in terms of specialists performing increasingly complex functions. We have been seeking an acceptable label for marketing in terms of specialization, and labels for performers in marketing as specialists. Now, by definition, a specialist is one "who devotes himself to one subject, or to a particular branch of one subject or pursuit."

What we need is a general, all-inclusive term for "marketing," and a group of qualified generalists to manage the functions grouped under "marketing."

It is quite possible that the age of specialization may be on the way out, certainly in the *business management* field. Staff duty will almost certainly be requisite to future advancement.

The future belongs almost certainly to the planner, rather than the doer. But naturally, not all "doers" are ready to accept this.

To be sure, we will still have our fields of "Finance," "Production" and "Marketing." But the role of *management* in a market-oriented company will be that of planning and coordinating the activities of the Big Three, all working together towards the chief objective of the business, the *profitable* filling of a customer need.

Marketing men appear to have failed to "sell" top management on this simple concept.

Obstacle No. 3: *A third obstacle to scientific marketing lies in faulty financial attitude and knowledge.*

On the one hand, management recognizes the need for "profit consciousness" on the part of its employees, but on the other, does little or nothing about instructing employees on the value of company profits to them, the employees. Many Americans, among them millions of employees, have fallen into the habit of criticizing profits, looking upon profits as an evil, and on the profit motive as the root of all evil. These tend to overlook the plain fact that the profit motive is and has been the central motivating force in a free society.

But the job of instructing employees—and the public—on the true meaning and benefits of profitable operations belongs to business. The responsibility for *explaining* rather than defending profits rests upon business.

Scientific marketing, by its very concept, is based on the proposition that business *must make a profit*. Bankrupt business never paid a dividend—but it never paid "a living wage," either. Nor can it increase wages, increase benefits, offer security, retirement pay, and medical insurance! Unprofitable business cannot even discuss "a guaranteed annual wage," or talk in terms of continued employment. But we repeat, financial education of the employees and of the community is the responsibility of business.

Business must, of course, first clarify its own think-

OBSTACLES TO MARKETING

(Continued from page 35)

ing, and accept bold, new and aggressive concepts of business-public communications. It is time for management to come out from behind its self-assumed cloak of silence, and to speak up. Good deeds are no longer enough—they must be *made known*. For assuredly, if we do not, political charlatans and misguided do-gooders will remake the business world "nearer to their hearts' desire."

Obstacle No. 4: Faulty Company Organization.

It has already been pointed out that lip service to the marketing concept is not enough. Some managers have "accepted" the idea, but have done little or nothing to bring it into active existence. Some otherwise competent managers insist on operating their companies on the basis of organizations (company set-ups) which were adequate or perhaps even "advanced" five, ten and fifteen years ago.

The very basis of marketing management is *management of change*.

Changing times and changing markets demand that we change our methods of meeting the changing challenges of the present and the future; and not on the basis of what was good enough yesterday, but of what is needed *today* and what can be foreseen as being needed *tomorrow*.

This may well mean changing the operating structure of the company. Literally hundreds of progressive companies have done just that in *the past three years*. And not a day goes by without the notice in the press or business publications of additional changes, or additional firms changing to conform to the demands of "the marketing concept." Some companies have changed their structure seven times in the past five years, and even the leaders in the field accept the need for constant review and frequent change in the future.

Before we can have scientific marketing, we must have the latest and most "scientific" set-up to carry out the new thinking, the new focus, the revised objectives, and to coordinate most efficiently the newly regrouped functions, according to our own company facilities and limitations.

Obstacle No. 5: Lack of Qualified Personnel.

Scientific marketing calls for a new type of approach and a new type of performer, starting with the top marketing executive or manager. Such a man must above all be a generalist, a planner, a coordinator, and a man with a well-rounded background in *managing* the many functions being grouped on the selling side of the business (as contrasted with the making and the financing activities).

Where do we find such people? There is no available reservoir of trained "marketing managers." The customer-oriented concept is only a few years old (it really is a re-birth, but for all practical purposes it

might be looked upon as "new"). The managers of this new activity are managerial infants. Most companies have no experienced marketing people on their staffs, certainly none that can be spared to competitors seeking to "raid" their competition. Yet, no business manager needs to be reminded that the greatest single, overriding cause of business failure is lack of management know-how (even though of course "competition," or "lack of funds" may be cited by those in trouble).

Scientific marketing demands that we place the management of the marketing functions in the hands of scientific marketing managers. Most businesses don't have them. They have at present, for the most part, a heterogeneous assortment of specialists (e.g. advertising, sales promotion, public relations, selling, product design, etc.) who often operate in Monk-like seclusion in the performance of their individual specialties. Product development, the greatest single advance in the field of progressive marketing in the post-war era, has too long and too often been left in the secret confines of the engineering laboratory, its development a deep dark secret, kept "top classified" from its own employees, including the salesmen. At the proper time, the "blankets" have been taken off the new miracle product, and the newly inspired sales force has been expected to take it out to the cold and often antagonistic world and hang up ever-new records in sales and more sales. In growing numbers business firms are reversing this, but the reversal is not accomplished without anguish, pain, and even open conflict.

Different companies are trying to plug up this deficiency in different ways. General Electric has marketing courses for non-marketing people, a separate marketing training course for those specially selected for marketing, and a marketing training program for executives who have already arrived. In many colleges and universities, the marketing courses have become the most popular courses in the business curriculums.

But the fact remains that *at present*, we do not have a sufficient number of trained marketing people available to fill the immediate needs of business. This is especially felt by those companies whose traditional policy has been to "promote from within."

Obstacle No. 6: Failure to gather, to interpret, or to use marketing facts correctly.

During the decade of the 1950's, industrial research went from \$1 to \$10 billion dollars. That is research to determine better ways of *making* things, and *making* more things (the production orientation again). Compared with such technical research, inquiry into *how better to sell* (marketing research) is still measured in pennies. Estimates differ as to how much business spends on marketing research—from ½% to 2.5% of industrial or technological research expenditures. Some observers, making a distinction between government-sponsored research (mostly for defense) and private industry research, see technological research at about five billion dollars, in which case marketing research done by industry might be as high as 5%

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PRODUCT MFD. _____ FC _____

MARKETING

OBSTACLES TO MARKETING

(Continued from page 36)

of industrial research. But still: 95 cents out of the dollar spent on how better to *make* things, and only 5 cents on how better to distribute or *market* them. Distribution—marketing—costs are between 50 and 55% of total price paid by the user; yet we spend only a pittance on researching how the customer can make better use of our products!

Obstacle No. 7: Failure to develop adequate marketing programs and strategies.

Planning, by its very nature, means *looking ahead*. Planning means choosing from alternative courses of action. It means studying all available facts, determining which amounts of "input," i.e. effort, manpower, money, etc., are likely to result in what amounts of "output," and which of these "outputs" we want to achieve under the circumstances.

A coordinated marketing program therefore starts

Creed

for modern marketing

1. Business exists to supply a product or service needed or wanted by the consumer. It is this consumer need that gives business its reason for existence.
2. To supply the right product or service, at the right time, in the right way, business needs first to establish what the consumer needs, where, when, how, and at what price.
3. A company's activities and decisions must all be aimed at filling these wants to the best of the company's ability, and in the most economical manner possible, making the most efficient use of its resources and skills.
4. In order to perform efficiently, a company must be soundly organized, well managed, adequately financed, and must make a fair profit on its operations.
5. Customer-oriented marketing furnishes management the tools for efficient and profitable performance of the total marketing function, and places marketing at the heart of the customer-oriented business. The scientific management of the marketing functions will therefore place marketing on a par with finance, engineering, and production in a successfully integrated total operation.
6. Marketing management becomes accordingly the medium for effectively satisfying customer needs and wants with optimum efficiency and profit.

with the findings of marketing research, the potentials and limitations of the market, the strengths and weaknesses of our own organization, the desired share of that market, the ability to attain this desired share. Before we can adequately map out our strategies, we must know realistically what *can* be accomplished. But too often, this "planning" is still the result of hunch, guess, and reliance on "past experience." Admittedly *there is no substitute for experience*. The difficulty often arises from the fact that too many managers confuse "*experience*," i.e. time spent on the job, with "*judgment*," which is intelligent opinion-forming as a result of competent work done on the job. That kind of experience is invaluable; and even that is not an adequate substitute for current facts.

Obstacle No. 8: Failure to develop adequate training programs.

As we have seen, many companies recognize the need for trained personnel. Several companies have done conspicuous work in this field. But in too many other cases, "in-company training programs" have been very largely limited to foreman-training (still laboring under the production-orientation!). Even executive training programs have a heavy accent on production, on manufacturing. And thus, the failure of a proper perspective leaves most companies with a shortage of trained *marketing* executives; nor are they, for the most part, being developed. It should be noted, however, that from one end of the country to the other, colleges and universities report marketing courses among the most popular in business school curricula.

Obstacle No. 9: Lack of Adequate Standards for Measurement and Control.

Because of the very nature of many of the marketing functions, the development of standards for measuring the effectiveness of the activity has proven a real stumbling block. Substantial progress has been made in some areas in the analysis and improvement of marketing performance. But the difficulty of setting standards, and the added difficulty of reconciling theory with practice has been a stubborn obstacle. (See Jan. issue "Be a Constructive Critic.")

Obstacle No. 10: Lack of Formal Creed for Modern Marketing.

Since the philosophy of customer-oriented marketing has not been universally accepted, or where accepted, has often been confused with "business as usual," the effectiveness of the application of the marketing concept depends largely upon the frame of mind of those who apply its principles. A Declaration of Principles, or Operating Creed for the 1960's, might therefore be of material aid in establishing the proper climate and attitude for the application of scientific marketing. The Creed at the left is offered in an effort to crystallize management attitude for the Decade of Marketing.*

* From the forthcoming text *MANAGEMENT IN MARKETING*, by Hector Lazo and Arnold Corbin, due for release in November, 1960, by McGraw-Hill Publishing Co., of New York.

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SERVICE and QUALITY

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- **MURIATE OF POTASH**
standard and granular types
- **SULPHUR**
lump and molten

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Exclusive Sales Agent

ASHCRAFT-WILKINSON CO.

ATLANTA, GEORGIA



Legume Fertilization Panel. Front row: Dr. William L. Garman, The Best Fertilizers Co.; R. L. Luckhardt, Collier Carbon & Chemical Corp.; Dr. W. E. Martin, University of California; and Victor Osterli, University of California. Back row: Dr. Merton Love, University of California; and Dr. Malcolm H. McVickar, Calif. Spray-Chem. Corp.



D. W. Galbraith, Agri-form of Northern Calif. and CFA president.



**Conference
speaker J. Earl Coke
advises Calif. growers to**

make full use of credit facilities

CALENDAR growers of agricultural products should make full use of the widespread credit facilities offered by banks and other crop production credit agencies, in their purchases of fertilizer, pesticides, seeds, and all of the other vital commodities and services which they must use." So said Earl Coke, Vice President, Bank of America, San Francisco, banquet speaker for the Eighth Annual California Fertilizer Conference.

The Conference, sponsored by the Soil Improvement Committee, California Fertilizer Association, was held on the campus of Fresno State College, and at the Hacienda Hotel, Fresno, on April 11 and 12. The 300 persons interested in the more technical aspects of plant nutrition and soil fertility who were in attendance acclaimed this as being by far the best of this entire series of conferences.

C. E. "Bill" Brissenden, J. R. Simplot Company, Pocatello, Idaho, told the Conference that phosphorus is an essential element, and outlined the origin and development of phosphate in western United States. He said that 1960 production is expected to reach 6 million tons of P_2O_5 , with 70% to be used by agriculture and 30% by industry.

Dr. Kent B. Tyler, Department of Vegetable Crops, University of California, Riverside, said that the application of phosphorus as a nutrient for vegetable crops became second only to nitrogen in California.

Dr. Albert Ulrich, Department of Soils and Plant Nutrition, University of California, Berkeley, reported valuable findings in his current three year study on plant analysis research with lima beans. This study, now in its third year, was made possible through a \$9000.00 cash grant-in-aid from

the Soil Improvement Committee, California Fertilizer Association. Dr. Ulrich, who has developed accurate diagnostic techniques for determination of nutrient deficiency levels in sugar beets and other crops, will publish his findings on bean diagnosis when his project has been completed.

Dr. Duane S. Mikkelsen, Department of Agronomy, University of California, said that the combination of California's barley, wheat, and oat crops are produced on about two million acres, and have a value of \$106 million. This is a larger acreage than any other crop, and covers a wider range of California geography, soil, and climatic conditions than any other crop. Production on the older grain lands has generally declined to an uneconomic level because of lack of fertilization, he said. The pressures of expanding population and higher land values have recently created interest in a fertility rehabilitation program.

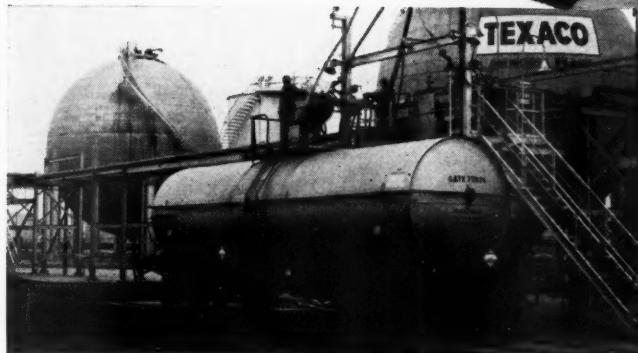
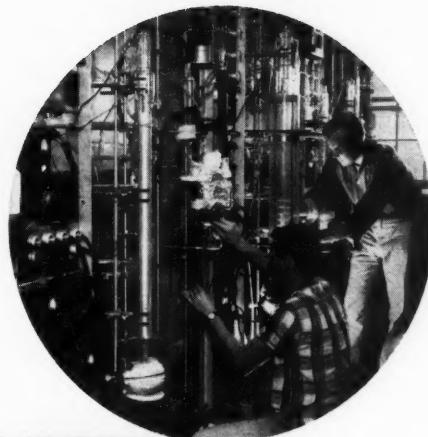
Fresno County Farm Advisor L. K. Stromberg presented an excellent report concerning the value of potash in cotton fertilization research which has been going forward in the San Joaquin Valley for the past several years.

DeWitt Bishop, Assistant Chief, California Bureau of Chemistry, reported on fertilizer and pesticides from a regulatory viewpoint.

The panel discussion on Legume Fertilization attracted much interest and audience participation. R. L. Luckhardt, Collier Carbon and Chemical Corporation, Los Angeles, was panel Moderator. Panel members were Dr. William E. Martin, Dr. Merton Love, and Victor P. Osterli, all of the University of California, Davis; and Dr. William L. Garman, The Best Fertilizers Company, Lathrop; and Dr. Malcolm H. McVickar, California Spray-Chemical Corporation, Richmond. ▲

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AVAILABILITY

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fertilizer
formulations
...begin with this Texaco formula

Here's a formula that can help you balance all the factors effecting fertilizer formulations. The ingredients? You can see them above: Texaco quality, availability, and service.

But why not weigh the advantages of this service yourself? Write for details—and our free 40-page manual on ammonia and nitrogen solutions—to Texaco Inc., *Petrochemical Sales Division*, 332 South Michigan Ave., Chicago 4, Ill., or 135 East 42nd Street, New York 17, N. Y.

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DIISOBUTYLENE, ORDORLESS MINERAL SPIRITS, NAPHTHENIC
ACID, PROPYLENE TETRAMER AND RUST INHIBITORS

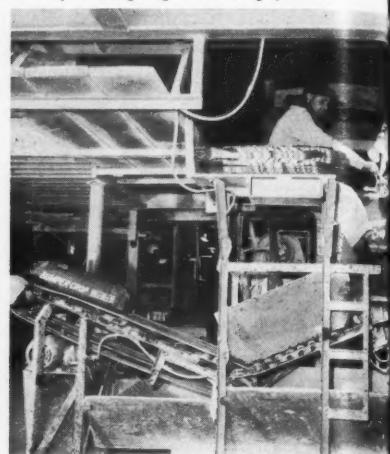
MATERIALS HANDLING CUSTOM APPLICATION

Don Peterson, partner and general manager of Ashkum, reviews production schedules for spring planting, fertilizer requirements with Charles J. Durham, plant superintendent.



Packaging change over at Ashkum

Packer operator at Ashkum fills 80-lb. multiwall bags with fertilizer on a St. Regis 327-PB packer. This is a two-tube pre-weighing valve bag packer.



Illinois fertilizer firm's new system increases production

By CHARLES EARL

WHEN the Ashkum Fertilizer Company, Ashkum, Illinois, decided on a change over in its multiwall packaging system, it wound up with increased production through a new package that cost less and performed better.

Ashkum originally installed a St. Regis 327-PB valve bag filling machine to pack their 80-lb. sewn valve bag about seven years ago. This is a two-tube, preweighing packer designed for 50 to 100-lb. bags of fertilizer. Their reputation for manufacturing an above average fertilizer, plus their desire to offer the best service possible, increased their business to the point that a second 327-PB packer was necessary by the start of their second year.

In recent years, the industry has seen a trend develop toward the 50-lb. bag. This caused a problem since it is necessary to fill 40 fifty-pound packages to obtain the same bagged tonnage.

Ashkum contacted St. Regis Paper Company, which evaluated the problem from every aspect. It was decided that a larger volume machine should be installed for the packing of 50-lb. bags. The recommendation was for a simultaneous filling and weighing machine—Model 161-FB. In addition to increased packing capacity, it offered automatic bag clamping, better weights, and automatic discharge of the bag after filling. The machine was installed early in 1959. It has consistently bagged 50-lb. packages at a rate of 17 to 20 bags per minute.

Ashkum's conversion from sewn valve to pasted valve bags is evidence of their continuing program to offer better service. After field testing the new

package, they were satisfied that it could and would do everything claimed for it. This satisfaction is proved by the fact that 100 per cent of their requirements for both 80-lb. and 50-lb. bags is now in this package.

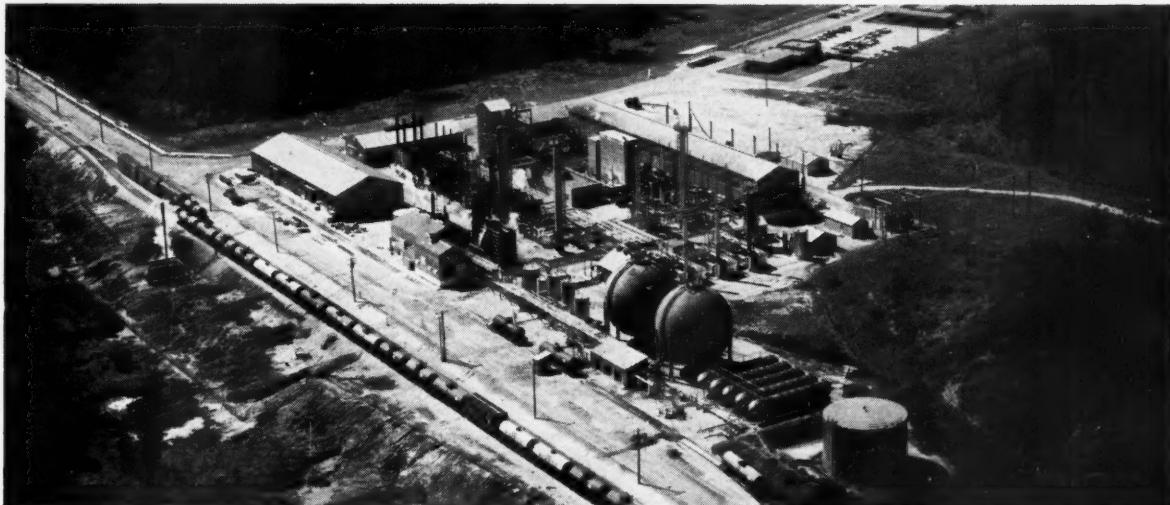
This progressive company has recently taken another step in the direction of continually improved customer service, by converting their bag construction to include a polyethylene coated inner kraft ply in place of the asphalt laminated ply which had been recognized as an industry standard for years. This conversion affords them better moisture vapor protection, more package flexibility, better filling, and better valve closure. The very nature of the polyethylene coated ply permits these advantages because it eliminates the brittleness and tendency toward rigidity of the asphalt laminated ply—especially during cold weather.

Don Peterson, Ashkum's general manager, had enough confidence in the new package to go along with the recommendation of a 10-lb. total basis weight reduction in both the 50-lb. and 80-lb. package with the net result being reduced cost while maintaining equal strength and performance to the construction formerly used.

Mr. Peterson believes that in this day of strong competition, bags must be trouble free and sufficiently strong to perform under all of our operating conditions. "That's why they must be sized and constructed satisfactorily to enable us to accomplish this end while our per ton cost is kept at a realistic level," he added. ▲

ARMOUR'S PROGRAM OF PROGRESS

*...to serve
you better*
.....



● Armour's modern ammonia plant near Crystal City, Missouri

For over sixty years, Armour has been serving American Agriculture; supplying the ever-growing demand for Armour and Vertagreen brand complete fertilizers by farmers and home gardeners. For more than a decade, we have served the fertilizer industry with phosphate products from our modern phosphate facilities in Bartow, Florida.

Each year, it has been our aim to improve our facilities, products and services. In 1959, Armour took another step forward to serve

you better with the acquisition of a modern ammonia plant at Crystal City, Missouri. Now, Armour's service to agriculture and the industry is more complete than ever.

As America's needs for more and better fertilizers continue to grow, Armour Agricultural Chemical Company will continue to improve the products and services that have made the Armour "A" a symbol of quality in the fertilizer industry . . . the "BIG A" in agriculture.

31 sales offices serving the fertilizer industry

ARMOUR AGRICULTURAL CHEMICAL COMPANY
General Offices, Atlanta, Georgia

NEW!

WEST VIRGINIA'S 1960 STANDARD BAG CONSTRUCTIONS TO SAVE YOU MONEY

Major savings for fertilizer packers are being achieved by three new standard WONDERWALL bag constructions perfected by West Virginia.

During a controlled test to determine possible savings in bag costs, various WONDERWALL constructions were developed in our Multiwall Packaging Laboratory. They were tested by 101 packers who shipped 569,224 tons of fertilizer in 12,307,546 WONDERWALLS.

The three recommended standard constructions and their actual savings, as used in normal conditions, are shown in the box.

For example, where a typical 100# old fashioned kraft bag usually would require 1/90 AL, 2/40, 1/50 for a total of four plies, the new standard WONDERWALL provides the same or superior strength with three plies: 1/100 AL, 1/40, 1/50 . . . at a saving of \$3.50 per M.

Secret of WONDERWALL's strength is Craftsman Clupak*, the paper with the built-in stretch that withstands far more impact without breaking than conventional natural kraft multiwalls. In a WONDERWALL bag, fewer plies are needed to do the job!

See how WONDERWALL standard bag constructions can *cut your costs, increase your profits*. Our technical service experts are ready to help you take full advantage of these new bag developments; call or write Multiwall Bag Division, West Virginia Pulp and Paper Company, 230 Park Ave., New York 17, N.Y.

*Clupak, Inc.'s trademark for extensible paper manufactured under its authority.



**West Virginia
Pulp and Paper**

NEW STANDARD WONDERWALL FERTILIZER BAG CONSTRUCTIONS

Pounds Packed	Old Style Natural Kraft Construction	New Wonderwall	Actual User Savings
100#....1/90AL, 2/40, 1/50.....	1/100AL, 1/40, 1/50..	\$3.50/M	
80#....1/90AL, 2/40, 1/50.....	1/100AL, 1/40, 1/50..	\$3.10/M	
50#....1/90AL, 1/40, 1/50.....	1/100AL, 1/60.....	\$3.80/M	

Smith-Douglass Co., Inc., Norfolk, Va., has shipped over 50,000 tons of fertilizer and related products in a million new WONDERWALL 100# standard construction bags. They report excellent results with a saving of \$3.50 per M and reduced bag breakage.



READER SERVICE

FREE INFORMATION to help you
solve fertilizer, pesticide problems

Chemicals

168—NEW DRI-SOL

Water content of new Dri-Sol ammoniating solutions is one-half of one percent, reports Commercial Solvents Corp. The company claims at least 7 benefits from use of the solutions: reduced shipping costs; better process control in continuous ammoniation; lower formulation costs; lower drying costs; increased dryer capacity or a drier product; increased plant capacity; faster curing and quicker shipment; and improved quality of both conventional and granular fertilizer. For complete information,

CIRCLE 168 ON SERVICE CARD

169—MILLER "658"

Diseases on potatoes, tomatoes, cucurbits, peanuts, citrus, avocados, azaleas and turf are controlled with Miller "658" Fungicide, the company reports. Miller Chemical & Fertilizer Corp. is the exclusive licensee for "658", developed by Union Carbide. A copper-zinc-chromate complex, "658" fungicide has provided excellent results for growers and in agricultural experiment stations, according to Miller. For complete information,

CIRCLE 169 ON SERVICE CARD

170—FUR-AG CONDITIONER

Fur-Ag reduces bag-set and helps keep goods free-flowing, according to The Quaker Oats Co.'s Chemical Div. Reported to be free from plant diseases, insects and weed seeds, it has a rich, natural dark color and is available in bags or bulk. Full information can be found in a bulletin, available by

CIRCLING 170 ON SERVICE CARD

171—COPPER SULFATE

Tennessee Corporation offers copper sulfate in powdered form as well as large, medium, industrial, granular and snow crystals. The firm mines copper and converts it to copper sulfate at Copperhill, Tenn. For complete information on Tennessee Corp.'s product,

CIRCLE 171 ON SERVICE CARD

172—FORMULATING WITH PYRAX ABB

When you use Pyrax ABB as the diluent, you need little or no stabilizer in formulating dusts with newer pesticides, reports R. T. Vanderbilt Co. Advantages claimed by Vanderbilt include easier handling, better coverage and simpler formulation. Complete information on the product is available. Simply

CIRCLE 172 ON SERVICE CARD

173—EMCOL SURFACTANTS

A new brochure listing Witco's complete line of Emcol surface-active agents

classified both by use and by chemical type can be obtained free of charge from Witco Chemical Co., Inc. Agricultural emulsifiers listed include Emcol products for use with chlorinated hydrocarbons, organic phosphates, 2,4-D and 2,4,5-T emulsifiable concentrates, and liquid fertilizer-liquid pesticide mixtures. For your copy

CIRCLE 173 ON SERVICE CARD

174—INCO 86

Samples and information on INCO 86 are available from Inland Chemical Corp. Inland says this new formulation was developed to meet the demand for a safe, anti-coagulant wet bait to be used in combination with dry bait in rodent control, or as an independent rodent bait when rats and mice have sufficient dry foods available and tend to take more readily to water bait. For samples and information,

CIRCLE 174 ON SERVICE CARD

175—GRANULATED DIAMMONIUM PHOSPHATE

Introduction of granulated diammonium phosphate as an addition to the Davison line has been announced by W. R. Grace & Co. Davison Chemical Div. The formula is 16-48-0. The exact 1-3-0 ratio simplifies mixing formulas while contributing to the high analysis character of the mixed product, the company points out. For detailed information on the product,

CIRCLE 175 ON SERVICE CARD

176—URAB GRANULAR

Urab Granular, a brush and weed killer for control of woody plants and deep-rooted weeds in non-crop land, is the subject of a product information sheet from General Chemical Div., Allied Chemical Corp. Directions for broadcast application and spot or basal application are given. Active ingredient in Urab is 3-phenyl-1, 1-dimethylurea trichloroacetate. For your copy of the data sheet,

CIRCLE 176 ON SERVICE CARD

177—"SALES-BUILDER" PROGRAM

Complete details on Velsicol's 1960 dealers' "Sales-Builder" program are

available to formulators and distributors from Velsicol Chemical Corp. The program provides a continuous flow of educational and sales information, and includes an insect control refresher course, guide sheets, a news letter, and promotional literature. Velsicol says the program will help salesmen and dealers during the spring and summer season and give them a wealth of sales training material to use during the fall and winter. For complete information,

CIRCLE 177 ON SERVICE CARD

Process Equipment

178—NITROGEN ANALYZER

Coleman Instruments Inc. reports that the Nitrogen Analyzer combines modern automation with the classic Dumas method developed over 50 years ago. To operate the Analyzer, the chemist prepares the sample and sets the timing controls. The Nitrogen Analyzer preheats and burns the sample, collects the nitrogen, measures it, and the operator can read the nitrogen content in cubic centimeters on a dial. A six-page bulletin contains complete information. For yours,

CIRCLE 178 ON SERVICE CARD

179—CHOPPING & DELUMPING FARM CHEMICALS

Supreme Choppers and De-Lumpers reduces large chunks of aldrin, DDT, urea, ammonium nitrate, sulfur, phosphates, potash and other materials to clean desirable sizes with minimum overgrinding, says Frank P. Miller & Son, Inc. The machine's low rpm, non-churning chopping action is anti-clog and self cleaning, according to Miller. Get details by

CIRCLING 179 ON SERVICE CARD

180—BLAW-KNOX CATALOG

A free illustrated catalog describing its Clamshell Buckets is available from Blaw-Knox Equipment Division. The company manufactures 350 sizes and types of Clamshell Buckets. A catalog will be mailed to you, if you

CIRCLE 180 ON SERVICE CARD

181—CROWN PUMPS

A line of centrifugals, self-priming centrifugals and electric powered pumps for use with liquid fertilizers is produced by Crown Manufacturing Co. Features include cast iron construction, corrosion-resistant iron shaft seals, replaceable volute and impeller, and use of your standard crankshaft engine. Complete details will be yours, by

CIRCLING 181 ON SERVICE CARD

how to use the READER SERVICE CARD

- Circle number of literature you want
- Print or type your name, position, company and address
- Clip and mail the Service Card

**See pages 65, 66 and 67 for information
on these Reader Service numbers:**

196—Zinc Deficiency Data
197—Dow Corning Silicone Guide
198—Polyethylene Storage Tanks
202—Pre-Emerge Spray Equipment

199—Disposable Metal Container
200—Gandy Co's 1960 Line
201—Michigan Tractor Shovels

**182—AIR-FLOAT
BULLETIN**

Information on Air-Float air-gravity conveyors is contained in a bulletin available from Kennedy Van Saun. In operation, the dry material to be conveyed is fed on to a smooth, rigid, porous plate through which low pressure air continuously diffuses. Because the conveyor is inclined about 6° to 8° the aerated material flows by gravity. You can get a copy of the bulletin if you

CIRCLE 182 ON SERVICE CARD

183—NIAGARA METERS

A 20-page, two color bulletin on Niagara Meters has been prepared by Buffalo Meter Co., Inc. Included is a section on Niagara chemical meters for volumetric measurement of corrosive products. Buffalo says that liquids now successfully measured include more than 100 chemical solutions, and lists the more common ones in the bulletin. To obtain a copy,

CIRCLE 183 ON SERVICE CARD

**184—FERTILIZER PLANT
BULLETIN**

A new brochure, illustrated with photographs of existing plants, describes the Carlile process for production of wet process phosphoric acid and ammonium phosphate fertilizers, including diammonium. Plant construction utilizes sectionalized design. Schematic flow diagrams show the step-by-step production of phosphoric acid and ammonium phosphate for fertilizers, including complex fertilizers. Plants described in the text range in capacities from 30 tons per day of P₂O₅ to 200 tons per day and from five tons per hour of high analysis ammonium phosphate to 25 tons per hour. Obtain your copy by

CIRCLING 184 ON SERVICE CARD

185—GOODYEAR PUMPS

Design of its pump is based on a simple Archimedean screw principle utilizing wiping action of a synthetic rubber bonded steel plate wheel on a steel rotor or screw, says Goodyear Pumps Inc. The company compares this feature to the squeegeeing action of a windshield wiper, in contrast to the grinding or rubbing action commonly found with conventional positive displacement pumps. Three sizes are offered: 15, 42 and 220 gpm, each offering maximum discharge pressure of 100 psi and capable of suction lifts up to 29 feet. A partial list of applications includes fertilizer and insecticide spray solutions, ammonium nitrate 10%, ammonium sulfate 10%, calcium nitrate and creosote. For a descriptive brochure

CIRCLE 185 ON SERVICE CARD

the pilot control in a few seconds without any aerial applying time lost for equipment changeover, modification or maintenance. Transland reports. The booklet describes how the Swathmaster works, its installation, and its advantages. For your free copy,

CIRCLE 190 ON SERVICE CARD

Miscellaneous

**191—ACME MASKS
DESCRIBED**

Two booklets available from Acme Protection Equipment Co.: "Useful Information for Users of Insecticides and Fumigants" and "How to Select a Gas Mask." The first illustrates masks for protection against organic phosphates, fumigants, etc., and describes care and maintenance of masks. The second booklet points out some of the things to consider in selecting the facepiece that will assure a secure fit, safety and acceptance by employees. Copies are free. Simply

CIRCLE 191 ON SERVICE CARD

**192—COATING OFFERS
"LIFE INSURANCE"**

Suprene chemical resistant coating was developed for service under severe acid or alkali fumes, moisture vapors and condensates found in farm chemicals and industrial plants, reports The A. J. Sackett and Sons Co. Using brush, roller or dip methods, it can be applied to steel, concrete, wood or fabric. The material will air dry within 2 hours. For literature and prices,

CIRCLE 192 ON SERVICE CARD

**193—LAB SERVICES
FROM CRIPPEN**

A bulletin from Crippen Laboratories, Inc. describes its agricultural chemicals testing services. Prices of analysis are included for insecticides, fungicides, herbicides, rodenticides and fertilizers. Special services offered by the firm also are listed. For your copy

CIRCLE 193 ON SERVICE CARD

**194—FREE MAP: POTATO
PRODUCING AREAS**

A free map showing "Principal Potato Producing Areas of the United States" is available from the State of Maine. Measuring 22" x 30", the full color map was prepared from information compiled by workers of the Golden Nematode Control Project under supervision of USDA. For your copy,

CIRCLE 194 ON SERVICE CARD

**195—PROTECTIVE CLOTHING
BROCHURE**

A broad line of rainwear and protective clothing, designed for industrial, utility and special applications, is described in a 12-page brochure issued by Mine Safety Appliances Co. The brochure provides details and illustrations of suits, coats, pants, aprons, hats and other accessories. Basic materials offered are heavy-weight and light-weight neoprene latex. Copies of the new bulletin are available by

CIRCLING 195 ON SERVICE CARD

FARM CHEMICALS



An American Cyanamid Company metallurgist runs flotation test on prospector's sample, a key step in evaluating worth of phosphate deposits.

HER BUSINESS IS MAKING YOUR BUSINESS BETTER

*Like all the men and women in Cyanamid's phosphate operation,
her only business is phosphates for your mixed fertilizers*

She's one of several hundred Cyanamid people who mine, process, research, deliver and service phosphatic materials for your acidulation and mixed fertilizer business. These people put Cyanamid's more than 40 years of phosphate experience into the kind of products and services you can use. Take advantage of both. Pick up your phone and call your Cyanamid representative.

Services you can use

Traffic Service: Cyanamid traffic specialists are ready to route and ship your orders without delays. Their knowledge can save you money and can make your oper-

ation run even more efficiently.

Technical Service: Cyanamid's staff of technical experts are on 24-hour alert. Often, what are new problems to you are solved problems to them. Make your formulation and production problems theirs. That's their job.

Sales Service: Cyanamid sales representatives are available to work with and for you in expanding present markets or in establishing new markets.

Products that serve: Cyanamid's only phosphate business is mining and manufacturing the highest quality products for your mixed fertilizer requirements.

- Florida Natural Phosphate Rock

- TREBO-PHOS® — Triple Superphosphate

- Phosphoric acid for acidulation

To manufacture fertilizers that sell... mix with Cyanamid's phosphates and service.

American Cyanamid Company, Agricultural Division, N. Y. 20, N. Y. *TREBO-PHOS is American Cyanamid Company's trademark for its triple superphosphate.



CYANAMID SERVES THE MAN WHO MAKES A BUSINESS OF AGRICULTURE

JUNE, 1960

MATERIALS HANDLING
CUSTOM APPLICATION

brush control



ups conifer production

Brush spraying has opened up avenues for increased conifer production in the Northwest by control of competing brush species. The author reports on his company's spray program and herbicide field testing.

By P. G. LAUTERBACH*

VAST AREAS of virgin old growth timber still abound to supply the forest products mills in the Pacific Northwest for many years. Regardless of the large supply, this virgin timber must be replaced as rapidly as it is cut to provide for perpetual and sustained maximum timber production. Future timber supplies, to be used 80 years hence, need to be established today. The rate at which these new forests grow also determines the rate at which the virgin old growth may be cut by an industry striving for sustained and uniform production. Helicopter seeding and seedling planting are used to promptly restock current cutover lands to return them to timber production immediately.

In addition to these newly cut areas, many areas of older logging are inadequately stocked with conifers. Most of this unsatisfactorily stocked land is occupied with varying densities and species of brush. Included are alder, which on some sites is a suitable commercial species, vine maple, big leaf maple, cherry, willow, cascara, salmonberry, ceanothus, and others. These species often completely occupy the site and prevent conifer restocking through intense competition. In other areas the initial conifer reproduction becomes overtapped by the invasion of alder with its faster juvenile growth. Animal (rabbit and mountain beaver) damage to young conifer seedlings in other areas has permitted vine maple

and other brush to overtop the conifers and occupy the site previously held by the conifers.

Aerial application of chemical herbicides and mechanical clearing with tractors are methods used extensively to accomplish brush control in our region. The latter method is used only in clearing ground on favorable topography where there are few or no conifers. Chemical control of brush is used in areas in which conifers exist or in which steep topography and large logs and stumps on the ground make mechanical clearing too difficult and expensive. These conditions also preclude ground application of chemicals and make aerial application from a helicopter the most feasible method. Helicopters have been found to be superior to fixed winged aircraft because of better downward penetration of chemicals. I must emphasize here that we are interested in brush control and not necessarily brush kill. Defoliation and reduced brush vigor for a period of several years is often sufficient to trigger conifer release.

CHOOSING THE SPRAY PROGRAM

We utilize two general types of spray programs; either summer foliage or spring dormant. The choice of methods depends upon the brush species to be controlled. For alder and willow, foliage spray in June and July is the most satisfactory type. The most suitable chemical used in control of these and related species is $\frac{1}{2}$ gallon of ACP 977 in $4\frac{1}{2}$ gallons of diesel per acre. This chemical contains $1\frac{1}{3}$ lbs. and $\frac{2}{3}$ lbs. acid equivalent of the butoxy ethanol esters of 2,4-D and 2,4,5-T respectively. This treatment results in a minimum of damage to established conifers, coupled with effective control of these

*Project Forester, Weyerhaeuser Co., Centralia, Wash. Presented before the Weed Society of America meeting, Denver, Colo., February 25, 1960.

undesirable hardwoods. This formulation, on the other hand, gives erratic control on cascara and cherry and only temporary control on vine maple or big leaf maple. Partial or complete defoliation will be achieved for one year on these latter species with near complete recovery following.

The spring dormant spray program is used to achieve more complete control of vine maple. This is done in March and April just before bud break. At this time, an aerial application of $\frac{1}{2}$ gallons of ACP Trinoxol, a 4 lb. 2,4,5-T ester in $9\frac{1}{2}$ gallons of diesel oil per acre achieves complete defoliation for one year. Partial recovery by sprouting and feathering occur during the second year. However, original vigor and size is not attained for at least 5-6 years or longer. This amount of control is usually sufficient to release overtopped conifers.

The success of our rehabilitation operations of growing more conifers is not entirely insured by the success of the brush control operation. If satisfactory control of overstory brush is obtained on areas in which it is necessary to plant trees, other problems arise which may prevent the conifers from attaining dominance. Release of subordinate herbaceous vegetation may result in a competitive cover equal to the previous hardwood overstory. This development is especially critical in areas where animals damage planted seedlings and prevent their normal growth or their ability to compete for the limited space available.

PROTECTION FROM ANIMAL DAMAGE

It would be appropriate to mention at this point that a chemical to be used in protecting seedlings from animal damage is of utmost importance if brush control is to be continued in many areas. The organization that produces a systemic repellent or poison for seedling protection holds the key to considerable further expansion in the use of chemicals for brush control. This protection is particularly necessary in areas to be planted. No brush control operations are undertaken where planted seedlings are doomed to extinction by animal damage. Foresters throughout the nation agree that animal damage prevention and control is a field of primary importance.

In the spring of 1958, seeking improvement in our dormant spray program, four new Amchem Products, Inc., chemicals were field tested. These include a polychlorinated benzoic acid in two formulations, a technical ester of 2,4,5-T formulation, and an invert emulsion of 2,4,5-T. The tests were conducted on replicated 5 acre plots and compared with a standard 2,4,5-T emulsifiable ester. All chemicals except the invert emulsions were applied at a rate of 10 gallons per acre of a mixture of chemical and diesel oil. The invert emulsions were applied at 10 gallons per acre of a mixture of diesel, water and chemical. To date the invert emulsion and technical ester of 2,4,5-T have been found to be approximately the same or slightly superior to the standard 2,4,5-T ester formulation, although final evaluations are not completed. In our field tests, we find it necessary to wait at least 3 or more growing seasons before making the final evaluations.

In the summer of 1958, eight new chemicals were tested and compared with our standard foliage spray formulation of ACP 977 in diesel oil. The new chemicals included 4 invert emulsions: 2,4,5-T butoxy ethanol ester, 2,4,5-T amine salt, 2,4,5-T Propionic butoxy ethanol ester, and 2,4-D amine salt. Also included were 2,3,6 trichlorobenzoic acid (amine salt), amino triazole and polychlorinated benzoic acid as amine salt, liquid amino triazole and the emulsifiable acid of 2,4,5-T. The invert emulsions were thinned with diesel and sprayed through a standard boom and nozzles.

USE OF AMINO TRIAZOLE

Liquid amino triazole applied at the rate of 2 lbs. per acre in 4 gallons of water successfully defoliated large big leaf maple during the second year. The first leaves in the spring following spraying were white showing an absence of chlorophyll. These leaves fell in July and were replaced by new leaves which were also white but smaller. These later leaves fell in August and early September, and no new leaves were formed. If control of big leaf maple is obtained with this chemical, it is the first time control has been achieved on this species by aerial application with any chemical. It is interesting to note that adjacent vine maple and alder as well as the conifers, all of which were sprayed, were unaffected.

The invert emulsions appeared to be effective on dense brush but caused more than normal conifer damage. In general, better downward penetration of the chemical was achieved with the invert than with normal emulsions.

In 1958, our forestry research staff established a nursery containing miscellaneous brush species and our major conifers for use in screening new chemicals being developed. A cooperative agreement between Weyerhaeuser Company and Amchem Products, Inc., was developed in which Weyerhaeuser agreed to nursery and field test certain new chemicals. Our forest physiologist, Dr. John Rediske, supervises Company greenhouse tests and physiological studies. He and Amchem chemists and formulators cooperate in developing new herbicides.

These chemicals plus other Amchem formulations are tested in the brush nursery. As a result of the 1958 screening tests, triethylamine salt of 2,4-D chlorophenoxy butyric was found to be truly selective in effecting control on alder and willow and yet not damaging to Douglas fir or other conifers. Following the nursery test, this chemical was applied in 1959 as a summer foliage spray in field trials on alder and willow mixed with conifers. Initial crown dying and partial defoliation of the alder and willow occurred with no conifer damage. If sufficient control of alder and willow is achieved by this new highly selective chemical it will be a valuable addition to the list of chemicals used in the Northwest.

In addition to testing this new chemical, new research methods were devised quantitatively measuring the effectiveness of herbicide application to brush. Included was a test of a new technique of light meas-

(continued on following page)

MATERIALS HANDLING CUSTOM APPLICATION

BRUSH CONTROL

(Continued from preceding page)

urement. Bottles containing light sensitive anthracene solution were placed at seedling height at regular intervals along the spray transects. Following are results of measurements in terms of percent of full sunlight:

Helicopter Sprayed June 24, 1959		
Date of Evaluation	June 24	September 29
	Percentage of full sunlight	
Sprayed.....	13	44
Unsprayed.....	12	9

This quantitative measurement of spray effectiveness will facilitate accurate comparison in future tests of different herbicides. Further evaluations of spray effectiveness on the alder and willow and new anthracene readings will be made in 1960. In addition to the above test, blotter cards were used to determine the volume of chemical applied to the spray transects.

Another new research development for spray effectiveness which is undergoing preliminary testing is the use of large scale aerial photographs taken on aerial ektachrome high contrast color film. The relative amounts of dead and live foliage as well as complete or partial defoliation are measured quantitatively on a densitometer from the film transparencies. One of

the biggest present obstacles to testing new chemicals is the time and difficulty involved in making accurate field evaluation. Also needed are methods of quantitatively measuring the results of the effectiveness of different herbicides. A method which combines the use of light sensitive anthracene with color photography and the densitometer if successful, would be an aid in rapid evaluation of the effectiveness of various chemicals and formulations. New chemicals then could be more quickly and efficiently tested.

Chemical brush spraying has opened up avenues for increased conifer production in the Northwest by control of competing brush species. Improvements are needed to find economical effective chemicals which are truly selective and do not damage conifers. Effective preliminary screening of a large number of new chemicals is now done at our brush nursery and the most promising of these chemicals are carried on to research field trials. Chemicals proven satisfactory in these trials are then further evaluated in project spraying on various company tree farms with their many complex brush-conifer problems. We feel there is a real need for rapid methods of quantitatively evaluating chemical effectiveness. New herbicides and better application can materially improve forest spray programs and thereby expand the use of chemical brush control to increase conifer growth on our industrial tree farms. ▲

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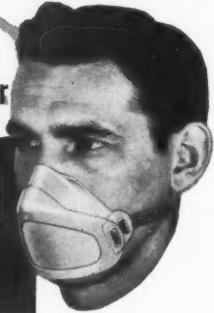
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PATENT REVIEWS

F
C

By Dr. Melvin Nord

PESTICIDES

U. S. 2,920,994, issued Jan. 12, 1960 to Jean R. Epperly, Harry C. Zeisig, Jr., Thomas R. Hopkins, and Ralph P. Neighbors, assigned to Spencer Chemical Co., discloses a method for controlling plant rust with an ester of a carbazic acid.

U. S. 2,920,995, issued Jan. 12, 1960 to Earl P. Williams and Raymond L. Mayhew, assigned to General Aniline & Film Corp., discloses the use of dinonylphenoxypropionitriles as fungicides for plants.

U. S. 2,920,996, issued Jan. 12, 1960 to Henry Bluestone and assigned to Diamond Alkali Co., discloses the use of 2-thiotetrahydrothiazine derivatives as fungicides.

U. S. 2,920,997, issued Jan. 12, 1960 to Calvin N. Wolf and Waldo B. Ligett, assigned to Pittsburgh Coke & Chemical Co., discloses fungicidal compositions such as 1, 3-dichloro-5-methyl-5-octenyl hydantoin.

U. S. 2,921,881, issued Jan. 19, 1960 to Glentworth Lamb and assigned to American Cyanamid Co., discloses fungitoxic-bacteriotoxic dodecylguanidine salts, such as borate, phthalate, and malate.

U. S. 2,922,739, issued Jan. 26, 1960 to Jack A. Snyder and assigned to E. I. duPont deNemours & Co., discloses insecticidal compositions containing O-hydrocarbon, S-(quaternary ammonium-sub-

stituted alkyl) esters of phosphorothioic acids.

U. S. 2,922,740, issued Jan. 26, 1960 to Earl P. Williams and Raymond L. Mayhew, assigned to General Aniline & Film Corp., discloses the use of N-alkyl- γ -hydroxycarboxylic acid amides for the control of nematodes.

U. S. 2,922,741, issued Jan. 26, 1960 to Ewald Urbschat and Bernhard Homeyer, assigned to Farbenfabriken Bayer A. G., discloses the nematocidal properties of amino-phenylcarbamic acid hydrazone.

U. S. 2,922,742, issued Jan. 26, 1960 to Richard H. Gruenhagen and assigned to The Dow Chemical Co., discloses the fungicidal properties of bicyclohexyl-4-amine and its inorganic salts.

U. S. 2,923,655, issued Feb. 2, 1960 to Anatole Vesterman and assigned to U.C.L.A.F., discloses fungicidal cuprous oxide compositions.

U. S. 2,923,656, issued Feb. 2, 1960 to Johannes T. Hackmann and assigned to Shell Development Co., discloses acyl thiourea fungicidal and bactericidal compositions.

U. S. 2,923,657, issued Feb. 2, 1960 to Nicolaas Dost and Rinke Berkenbosch, assigned to Shell Development Co., discloses fungicidal compositions such as N-methyl-p-nitrosoaniline and similar compounds.

SEED TREATMENT

U. S. 2,921,410, issued Jan. 19, 1960 to James M. Merritt and assigned to Merck & Co., Inc., describes a method of treating seeds, such as cotton seeds, with gibberellin and a fungicide.

The use of the gibberellin tends to overcome the decrease in the number of seedlings produced as a result of the use of the fungicide coating. Zinc trichlorophenate is preferred as the fungicidal material.

HERBICIDES

U. S. 2,923,634, issued Feb. 2, 1960 to Robert F. Lindemann and assigned to Diamond Alkali Co., discloses selective herbicidal compositions containing as the active ingredient dimethyl 2, 3, 5, 6-tetrachloroterephthalate.

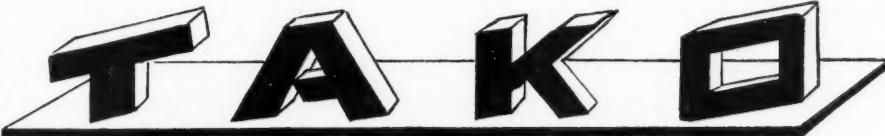
For example, tests cited in the patent indicated 100% stand for the broadleaves and 10% stand for the grasses, thus evidencing a high degree of selective herbicidal activity.

SOIL CONDITIONERS

U. S. 2,920,950, issued Jan. 12, 1960 to Lorenz W. Heise and Milton Johnson, assigned to A. O. Smith Corp., discloses a material which, when combined with soil, will serve to retain the loose consistency of the soil and also add elements to the soil which aid in stimulating plant growth. The preferred composition consists of 32% ferric hydroxide, 0.4% trace-elements, and 67.6% calcium sulfate. It is produced by neutralizing waste pickle liquor with lime.

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PEST REPORTS

By Kelvin Dorward*

PEA APHID was very active on alfalfa over a wide area by the latter part of April. Activity was noticeable as far north as Delaware and Maryland where some counts were more than 100 per sweep and into southern Illinois where counts averaged slightly less than 100. The insect was on the increase in Missouri and Arkansas and treatments were applied in some sections of Texas and Oklahoma. Heavy populations were recorded throughout Arizona.

The **greenbug** caused limited damage to small grains in localized areas of Texas and Oklahoma where some treatments were applied. In some areas parasites, predators, and climatic conditions were reducing the populations. In areas of both Texas and Oklahoma the spotted alfalfa aphid required treatment. Elsewhere in the southwest populations of the insect were generally light.

During early April the **army cutworm**, with populations of 2-5 per square foot, was reported infesting 500,000 acres of rangeland in southwestern and south central Idaho. Damage was confined to rangeland. Cutworms were also infesting several thousand acres of rangeland in Malheur county, Oregon.

Among the truck and garden insects the **cabbage looper** was active in various areas. In Arizona infestations of the looper were heavier and earlier than normal in lettuce and other crops. Treatment was required on lettuce in the Salinas area of Monterey county, California. The insect caused damage to vegetables in the Rio Grande valley of Texas and to cabbage plantings in the Charleston, South Carolina, area. The **potato psyllid** caused damage to potatoes and tomatoes in the lower Rio Grande valley of Texas and control measures were required.

Cotton insects were becoming active in several areas by the latter part of April. Thrips were reported from Georgia, Texas, New Mexico,

and Arizona. Some treatments had been applied in Arizona by late April. **Fleahoppers, aphids, spider mites**, and **boll weevils** were reported from Texas, but all light. Some **cutworm** damage to cotton was reported in Zavala county, Texas.

In early April, a **pink boll-worm** moth was taken in an electric light trap at San Luis, Yuma county, Arizona. Intensive surveys have failed to reveal any infestation in the county and all stub cotton and debris in the immediate area of the find were destroyed. There was a heavy emergence of pink bollworm moths in Maricopa county, Arizona, during early April. Eighteen moths were taken in light traps one night.

The spring surveys to determine the number of **boll weevils** surviving the winter were completed in Georgia and Tennessee during April. In Georgia, the surviving counts averaged 407 live weevils per acre of surface trash compared with 329 in 1959. Counts were made in McNairy, Tennessee, where the number of surviving weevils per acre of trash was 807. The average for the area in 1959 was 124. With favorable weather conditions, early season boll weevil damage can be expected in the west Tennessee area.

The **western pine beetle** and other species of bark beetles are seriously affecting forest stands in El Dorado, Nevada and Calaveras counties, California. The heaviest damage is in El Dorado county where an estimated 6,850 ponderosa pines of all ages have been killed. The damage is increasing in certain areas.

Activity of the **face fly**, which became a concern on livestock in several states last season, was reported in April. Although reported earlier in the year from houses, the first reports of activity around livestock this season came from Delaware, New York, Ohio, and West Virginia. The New York report stated that in Tompkins county heifers averaged about 25 flies with the average being 10 per animal. Horses averaged 2-5 per head. The fly was also reported

from Seneca county. Face flies were first seen in Wayne county, Ohio, April 20. The West Virginia report was from Greenbrier county. There were several reports of the fly being on horses in New Castle county, Delaware.

EUROPEAN CORN BORER LOSSES DOWN IN 1959

The loss of corn grown for grain utilization from damage attributed to the European corn borer in 1959 was estimated to be 67,763,000 bushels from the 18 reporting states. The value of this loss based on the season's average price totaled \$71,979,000, being the smallest monetary loss since 1951 when the loss was \$57,438,000. Loss in 1958 was estimated to be 100,699,000 bushels valued at \$98,434,000.

Nebraska recorded the heaviest loss in 1959 with the dollar value being \$17,968,000, with Iowa having the second largest loss, \$15,868,000.

The basis for the loss estimates was determined by the survey of European corn borer populations conducted by state personnel during the fall of 1958. The index of 3 per cent loss per borer per plant was used to compute the loss in bushels.

POTATO PSYLLID OVERWINTERING SURVEY

The annual survey to determine the potato psyllid population in the overwintering areas of the southwest was conducted during March. The potato psyllid is the carrier of yellows disease of potato and tomato and knowledge of the population in the overwintering areas gives an index as to the potential populations that can be expected in more northern states, particularly Utah, Colorado, and Nebraska. Wild *Lycium* is swept with a net to make the psyllid counts.

Potato psyllid counts this spring were comparable to those of 1959 in both Arizona and California. With the overwintering host being very abundant in areas surveyed in both states, there is a potential for severe outbreak populations west of the Rocky Mountains.

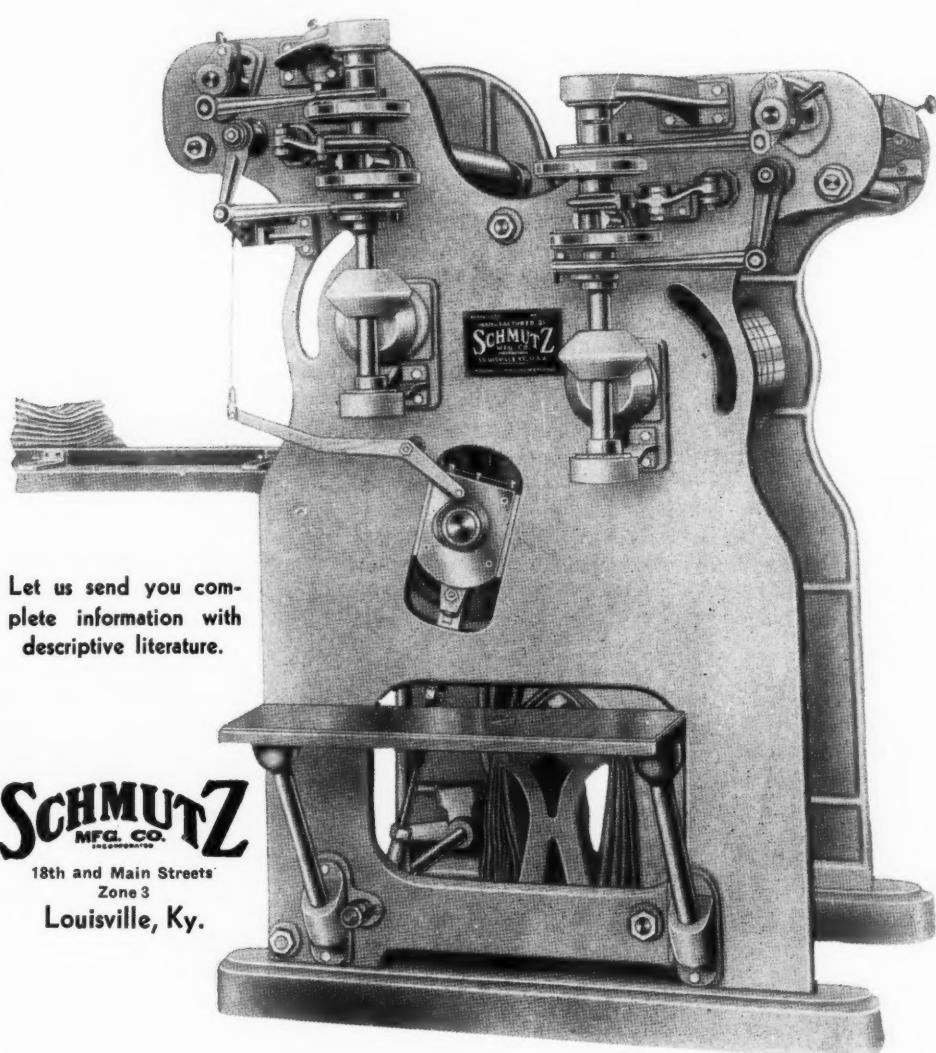
* Chief Staff Officer, Survey & Detection Operations, Plant Pest Control Div., Agricultural Research Service, USDA.

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NEWS OF THE INDUSTRY

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SOLAR NITROGEN TO BUILD \$15 MILLION PLANT IN MO.

A new chemicals plant, to cost about \$15 million, will be built near Joplin, Mo., by Solar Nitrogen Chemicals, Inc., according to a joint announcement by Charles E. Spahr, president of The Standard Oil Co. (Ohio), and Ralph K. Gottshall, president and board chairman of Atlas Powder Co. Solar is owned equally by Standard and Atlas. Edward F. Morrill, vice president of Standard, is president of Solar and of Sohio Chemical Co. Edward J. Goett, executive vice president of Atlas, is vice president of Solar.

The plant, which will produce anhydrous ammonia, urea and related products, is expected to be completed in about one year. It will be operated by Atlas, and its production will be marketed by Sohio Chemical Co. Sohio is both manufacturing and sales agent for Solar's similar plant at Lima, at which a \$2 million expansion program is underway.

WITCO INCOME, SALES UP

Witco Chemical Co., Inc. reports a net income of \$585,400 or 76 cents per share for the first three months of 1960—an increase of 28 per cent over \$457,800 or 60 cents per share for the comparable period the previous year.

Sales and other income for the

first quarter of 1960 were \$15,249,800 as compared with \$12,893,100 for the same period in 1959—an 18 per cent increase.

CSC SALES & INCOME UP

Commercial Solvents Corp. reports for the quarter ended March 31, 1960, consolidated net earnings of \$1,133,668, equal to 40 cents per share on 2,796,250 shares of common stock. This compares with 1959 quarterly earnings of \$665,680, equal to 24 cents per share on the 2,741,422 shares outstanding at that time.

Sales for the 1960 quarter were \$16,213,137, up from the \$15,787,406 reported for the three months ended March 31, 1959.

AAC BREAKS GROUND FOR NEW PHOSPHATE WASHER

Construction is underway on a new phosphate washer at the Palmetto mining location of The American Agricultural Chemical Co., 10 miles southeast of Pierce. Company president C. M. Powell broke ground on March 14.

To include both washing and recovery equipment, the new Palmetto installation is scheduled for completion in March, 1961. It will include recently perfected hydro-sizing equipment, to give maximum overall recovery of phosphate. The hydro-sizer was developed by R. D. Evans of AAC's metallurgical staff, and is patented by the company.

SPENCER REPORTS REDUCED EARNINGS

Spencer Chemical Co. President John C. Denton announced that unusually severe weather in the quarter ended March 31 delayed the movement of fertilizer and that a change in foreign marketing methods temporarily affected export sales of polyethylene. This resulted in reduced sales and earnings for the company in the third fiscal quarter and nine months ended March 31, as compared with a year earlier.

In the nine months ended March 31, sales were \$35,938,049, compared with \$36,367,640 a year earlier. Net income was \$2,181,694, equal after preferred dividends to \$1.57 a common share, compared with \$2,228,585 or \$1.62 a share, a year earlier.

During the three months to March 31, net sales amounted to \$11,417,107, compared with \$12,489,063 a year ago. Net income was \$415,681, equal to 25 cents a common share, compared with \$854,576 or 64 cents a share.

Business prospects for the fourth quarter ending June 30 are considered to be very good, Denton said.

NIAGARA CHEMICAL BUILDING TWO NEW PESTICIDE PLANTS

Two new pesticide production units—one at Greeley, Colo., the other at Ayden, N. C.—are now under construction for Niagara Chemical Div. of Food Machinery and Chemical Corp.

Says Stuart Bear, division manager, "In addition to producing a number of standard Niagara products, these facilities will make possible the custom blending of formulations designed to meet specific local needs and conditions which might arise."

Slated for production this spring, both units will contain dust-mixing and liquid-formulating equipment.

GRACE OFFICE MOVES

W. R. Grace & Co., Grace Chemical Div., has moved its Southeastern District Sales Office from Tampa, Fla., to 1402 E. Morehead, Charlotte, N. C. Lee Slusher will continue as Southeastern District sales manager.



C. M. Powell, president of The American Agricultural Chemical Co., breaks ground for the company's latest expansion project at its Pierce mines. Left to right: H. R. Quina, maintenance and construction supervisor; F. R. Bergquist, mines manager; president Powell, and J. S. Gruel, mines superintendent.

TEXAS GULF ACQUIRES UTAH POTASH PROPERTIES OF DELHI-TAYLOR

Texas Gulf Sulphur Co. and Delhi-Taylor Oil Corp. announced late in April that they have signed an agreement whereby Texas Gulf will acquire and commercially develop Delhi-Taylor's Utah potash properties.

Delhi-Taylor will retain a 25 per cent net profits interest in the properties and will receive guaranteed net profit payments of \$4,500,000 over a four-and-one-half year period.

A first payment of \$500,000 has been received by Delhi-Taylor. Texas Gulf will have until January 1, 1961 to complete an examination of the technical aspects of the project, and it is assumed that commercial developments will begin upon completion of this work.

PGH. CHEM. DEDICATES MALEIC ANHYDRIDE PLANT

Pittsburgh Chemical Co., a subsidiary of Pittsburgh Coke & Chemical Co., has dedicated its new \$4 million maleic anhydride plant at Neville Island.

The new facility will have an annual capacity of 20 million pounds and is scheduled to go on stream early in 1961, according to W. K. Menke, Pittsburgh Chemical president.

MONSANTO REPORTS SALES AND EARNINGS

Monsanto Chemical Co.'s combined sales for the first quarter of 1960 amounted to \$212,114,000 compared to \$197,842,000 for the same period in 1959. Combined sales include those of the parent company, its domestic and foreign subsidiaries and one-half of the sales of the 50 per cent-owned associated companies.

Net income from such sales was \$16,131,000, a decrease of three per cent from earnings of \$16,615,000 for the first quarter of 1959.

FARBWERKE HOECHST AG. RECOMMENDS 16% DIVIDEND

The supervisory board of Farbwere Hoechst AG., Frankfurt-Hoechst, West German chemical concern, has approved the 1959 annual report and has recommended

a dividend of 16 per cent for 1959. Fourteen per cent was paid for 1958.

Total 1959 Hoechst sales amounted to DM 2,222 million (about \$529 million), an increase of 17.6 per cent over 1958. 1959 exports totaled DM 720 million (about \$171 ½ million) or 32.4 per cent of total sales—an increase of 22.9 per cent over 1958.

DIAMOND HAS RECORD SALES, EARNINGS IN 1st QUARTER

Raymond F. Evans, chairman and president, told stockholders at Diamond Alkali Co.'s recent annual meeting that first quarter 1960 sales and earnings reached record levels for any first quarter period.

Net sales for the first three months of 1960 were \$32,991,789 against \$30,194,067 in the corresponding 1959 period, an increase of 9 per cent.

Net earnings for the quarter, after provision for Federal Income Taxes, amounted to \$2,867,520 compared with \$2,125,901 in the same 1959 period.

Diamond will spend 30 to 35 million dollars in the next two years on expansion and improvements from internally generated funds without recourse to permanent financing, Evans said.

LIQUID MIXED FERTILIZER MOVES UP THE MISSISSIPPI

The first shipment of liquid mixed fertilizers ever to move by barge on the Mississippi River has reached Dubuque, Iowa, from the TVA chemical plant at Muscle Shoals, marking what is believed to be a new and unique practice of the fertilizer industry, TVA said recently.

This liquid fertilizer is an 11-33-0 mixture to be used by Ris-Van, Inc., in the distributor demonstration program in which industry, agricultural colleges, and TVA cooperate in demonstrating to farmers the advantages of highly concentrated materials. Ris-Van, a subsidiary of Stepan Chemical Co., plans to mix a part of the material with potash to form other grades of liquid mixed fertilizers.

High costs of shipping liquid fertilizers over long distances by truck and rail and shortage of appropriate transportation facilities during the rush season made this barge movement attractive. Use of the new high analysis liquid material is expected to encourage expansion in production and use of liquid mixed fertilizers. Shipping the material by barge from Muscle Shoals to Dubuque resulted in a saving of more than \$6 a ton over other forms of transportation.



Giants' grounds supervisor at new Candlestick Park, Matty Schwab, Jr. (right), uses 20 lbs. of the granular-type Hercules "Nitroform" per 1,000 square feet in the infield. Here he examines the product with Don Allison, Hercules Powder Co.'s San Francisco office; and Karl Kolb, Agriform of Northern California, Inc., Nitroform distributor. Hercules Powder manufactures Nitroform at Woonsocket, R. I., and by year's end will also produce it at the Hercules, Calif., plant.

NEWS OF THE INDUSTRY

TALLAHASSEE HONORS FLORIDIN COMPANY



Donald H. Mowell, Floridin president, accepts an award from R. Spencer Burress, president of the Tallahassee Chamber of Commerce, at the party sponsored by the Chamber to commemorate Floridin's fifty years of service to industry.

The fiftieth anniversary of Floridin Co., pioneer producer of fuller's earth diluents, carriers and extenders for pesticide formulations, was observed recently with a week-long celebration in Tallahassee, the firm's headquarters city.

Floridin was founded in 1910 to supply the oil industry with fuller's earth. Through research the company found that fuller's earth possessed properties suiting it for use as a diluent and carrier of pesticide chemicals. This application is one of more than 100 developed by Floridin research technicians over the years.

Floridin Co. is a subsidiary of Pennsylvania Glass Sand Corp. Its Golden Anniversary celebration was climaxed by a birthday party sponsored by the Tallahassee Chamber of Commerce in cooperation with local, county and state officials who saluted the progress made by Floridin in the past half-century.

IMC EARNINGS SHOW 47% GAIN FOR NINE MONTHS

International Minerals & Chemical Corp. has announced net earnings of \$2,318,358 or 94 cents per share on the 2,364,592 common shares outstanding for the third quarter ended March 31, 1960.

This is a 13 per cent gain over earnings of \$2,044,872 or 83 cents per share on the 2,343,327 common

shares outstanding for the corresponding period a year ago.

Net earnings for the first nine months of the fiscal year were \$4,046,324 or \$1.59 per common share, up 47.3 per cent over the 1958-59 nine-month earnings of \$2,746,332 or \$1.05 per share. Sales for the nine months were \$81,813,390, representing a 10 per cent gain over the total of \$74,377,209 for the corresponding period a year ago.

TGS REPORTS 1st QUARTER SALES OF \$13.1 MILLION

Gross revenue from sales of Texas Gulf Sulphur Co. for the three months ended March 31, 1960 totaled \$13,106,439, down from the \$14,032,634 reported for the same period a year ago, according to the company's quarterly report.

Net earnings for the quarter amounted to \$2,711,429, equivalent to 27.1 cents per share on the 10,020,000 shares outstanding, as against \$3,250,556 or 32.4 cents per share for the first quarter last year.

Sales were down in the first part of the quarter but improved in the latter part, according to Fred M. Nelson, chairman.

A PLANT A YEAR PLANNED BY GOVERNMENT OF INDIA

During the third Five-Year Plan of the Government of India, one fertilizer plant in each of the five important states would be set up and go into operation at the end of each year of the plan-period.

Each will have a production target of 60,000 tons. The Sindri factory produces 70,000 tons of fertilizers, and another 60,000 tons is expected from the new factory which is being set up under the second Five-Year plan. At the end of the third Five-Year plan period, fertilizer production would be in the order of 430,000 tons.

A conservative estimate of India's total fertilizer requirements for a year is placed at 1,500,000 tons. So, unless a dozen more fertilizer plants are set up there, the country will still depend on foreign imports in years to come.

IMC SKOKIE CENTER WINS AIA "AWARD OF MERIT"

International Minerals & Chemical Corp.'s Administrative and Research Center in Skokie, Ill., received the American Institute of Architects "Award of Merit" for 1960 at the recent annual AIA convention in San Francisco.



During a tour of the new 14,000 sq. ft. plant of Wagner Bag Co., Inc., of Salt Lake City, guests from the Columbia-Geneva Div. of U. S. Steel Corp. inspect one of their company's fertilizer bags which is made on the plant's new multiwall packaging equipment. Left to right: G. M. Weight, G. L. Hartvicson, L. G. Bywater and F. B. Johnson, all of U. S. Steel, and Newell Ward, St. Regis Paper Co. packaging engineer. The official opening and plant tour were held in April; the plant was completed in November at about the time Wagner Co. merged with St. Regis.

RECORD SALES FOR OMCC

Record first quarter sales and a 33-1/3 per cent increase in net earnings were announced by Olin Mathieson Chemical Corp. for the first quarter of 1960 compared with the same period in 1959.

Net earnings for the first three months of 1960 were \$8,567,000 or 64 cents per share. This compared with \$6,395,000 or 48 cents per share in the first quarter a year ago.

First quarter sales totaled \$163,132,000, a 2 per cent increase over the first quarter record set in 1959 when sales totaled \$159,909,000.

The new \$8 million synthetic urea plant constructed by SunOlin Chemical Co. at North Claymont, Del., began operations at the end of February. SunOlin is jointly owned by Olin Mathieson and Sun Oil Co. Olin Mathieson will market the plant's annual output of 73,000 tons.

COTTON COUNCIL URGES PROMPT ACTION ON WEEVIL

A cotton production authority told a House subcommittee in testimony released recently that the boll weevil may get completely out of control unless prompt action is taken.

Robert R. Coker, president, Coker's Pedigreed Seed Co., Hartsville, S. C., testifying in behalf of the National Cotton Council, told the House Agriculture Appropriations Subcommittee, "Insecticide-resistant boll weevils are spreading over wider areas each year.

"Although many farmers must spend as much as 5 to 6 cents per pound of cotton or up to \$45 per acre for poisoning, these measures have become less effective."

He quoted U. S. Department of Agriculture figures which show that three times as many weevils survive the winter to invade cotton fields in the spring as survived 12 years ago.

Mr. Coker cautioned the committee, which is chaired by Rep. Jamie L. Whitten, (D-Miss.), that, "Growing apprehensions as to potential hazards involving insecticide residues could restrict the use of certain chemicals, at present the farmer's only weapon against the weevil."

He pointed out that Congress has

already started a research effort to eliminate this major cotton insect, having appropriated \$1.1 million for construction of a central cotton insect laboratory.

This facility will not be completed until 1961, however, and no effective increase in the boll weevil program will be realized until 1962 unless some immediate action is taken, Mr. Coker said.

He advocated that the Department of Agriculture start before

1962 to build the laboratory's research staff so that a program can be developed, thereby minimizing delay after the building is completed.

DOW DIVIDEND

Dow Chemical Co.'s board of directors has declared a dividend of 35 cents per share on its common stock, payable July 15, 1960 to stockholders of record at the close of business on June 15, 1960.

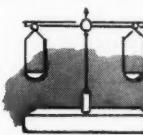


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NEWS OF THE INDUSTRY

Calendar

June 9-11. Manufacturing Chemists' Association Annual Meeting, The Greenbrier, White Sulphur Springs, W. Va.

June 12-15. National Plant Food Institute Annual Meeting, The Greenbrier, White Sulphur Springs, W. Va.

June 13-16. Western Society of Soil Science meeting, University of Oregon, Eugene.

June 21-22. Association of Southern Feed and Fertilizer Control Officials annual meeting, Riverside Hotel, Gatlinburg, Tenn.

June 25. Del-Mar-Va Peninsula Fertilizer Association Annual Convention, George Washington Hotel, Ocean City, Md.

June 26-29. American Society of Landscape Architects Annual Meeting, Waldorf Astoria Hotel, New York, N. Y.

June 27-29. Entomological Society of America, Pacific Branch, meeting, Davenport Hotel, Spokane, Wash.

June 27-29. Northwest Section, American Society of Range Management, Summer Meeting, John Day, Ore.

July 11-13. Western Society of Crop Science, University of Nevada, Reno.

July 13-15. Pacific Northwest Fertilizer Conference, Hotel Utah, Salt Lake City.

July 20-21. Summer Lime and Fertilizer Conference, Otesaga Hotel, Cooperstown, N. Y.

July 27-30. Southwest Fertilizer Conference and Grade Hearing, Galvez Hotel, Galveston, Tex.

Aug. 2-3. Ohio Pesticide Institute Meeting, Ohio Agricultural Experiment Station, Wooster, Ohio.

Aug. 10-11. Northeast Regional Fertilizer Safety School, Park Sheraton Hotel, New York City.

Aug. 16-17. Midwest Regional Fertilizer Safety School, National Safety Council Headquarters, Chicago, Ill.

Aug. 21-25. Canadian Fertilizer Association Annual Convention, Manoir Richelieu Hotel, Murray Bay, Quebec, Canada.

Aug. 25-27. Southeast Regional Fertilizer Safety School, Wilmington, N. C.

Aug. 25-27. Mississippi Soil Fertility & Plant Food Council 1960 meeting, Buena Vista Hotel, Biloxi, Miss.

Sept. 24-26. Western Agricultural Chemicals Association 31st Annual Meeting, Palm Springs Riviera Hotel, Palm Springs, Calif.

Sept. 27-29. National Agricultural Chemicals Association Annual Meeting, Hotel del Coronado, Coronado, Calif.

Sept. 29-30. Northeast Fertilizer Conference, Hotel Hershey, Hershey, Pa.

Oct. 5-6. Southeast Fertilizer Conference, Atlanta Biltmore Hotel, Atlanta, Ga.

Oct. 10-11. Four-State Aerial Applicators Conference, sponsored by Norkem Corp., Hotel Chinook, Yakima, Wash.

Oct. 17-18. National Safety Council, Fertilizer Section, National Safety Congress, Chicago, Ill.

Nov. 2-4. Fertilizer Industry Round Table, The Mayflower, Washington, D. C.

Nov. 3-4. Annual Convention, Pacific Northwest Plant Food Assn., Boise, Idaho.

Nov. 9-11. National Fertilizer Solutions Association, Peabody Hotel, Memphis, Tenn.

Nov. 13-15. 37th Annual California Fertilizer Association Convention, del Coronado Hotel, Coronado, Calif.

PHILLIPS ANNOUNCES SALES & EARNINGS FOR 3 MONTHS

Phillips Petroleum Co. earned 75 cents a share in the 1960 first quarter, the same amount a share as for the corresponding period of 1959, stockholders were told in the quarterly report issued recently. Net income was \$25,803,588.

Gross income totaled \$301,426,810, compared with \$299,825,162 for the first quarter of 1959.

FMC SODA ASH EXPANSION

FMC plans another major expansion of soda ash output in Green River, Wyo., according to the Chlor-Alkali Div. of Food Machinery and Chemical Corp. Production will be expanded by 200,000 tons per year, bringing total annual capacity to 750,000 tons per year. First phase of the expansion is to be completed by early 1961 and the second by early 1962.

TEXACO DECLARES REGULAR DIVIDEND

Directors of Texaco Inc. have declared the regular quarterly dividend of 65 cents per share, payable June 10, 1960 to stockholders of record on May 6.

NATIONAL DISTILLERS 1st QUARTER SALES RISE

An increase of \$6,258,000 in net sales was registered by National Distillers and Chemical Corp. in the first quarter of 1960 over the same period of 1959, John E. Bierwirth, chairman, and Roy F. Coppedge, Jr., president, announced recently. Net sales for the three months ended March 31, 1960, totaled \$134,318,000 against \$128,060,000 in the first quarter of 1959.

The company said that its chemical division as a whole made satisfactory progress with the exception of fertilizer chemicals where sales were delayed by heavy snows in the mid-west.

PENNSALT'S 1st QUARTER

Pennsalt Chemicals Corp. reported first-quarter earnings of \$1,269,300, equal to 33 cents a share, on sales of \$21,944,400.

For the corresponding quarter last year, earnings were \$1,216,900 or 32 cents a share on sales of \$20,965,000.

STAUFFER SALES, EARNINGS CONTINUE TO RISE

Sales and earnings of Stauffer Chemical Co. for the first quarter of this year were slightly higher than in the same quarter last year, reports Christian de Guigne, board chairman.

Net sales for the three months ended March 31, 1960 were \$53,210,000 compared with net sales of \$52,885,000 for the corresponding period last year. Net earnings were \$5,048,000 or 55 cents per share as against \$4,956,000 or 54 cents per share earned during the first three months of last year.

At the annual meeting of stockholders, all directors were re-elected. Mr. de Guigne told stockholders that the company was con-

tinuing its expansion program with construction of new or larger facilities at Niagara Falls, N. Y.; Delaware City, Del.; Henderson, Nev.; Vernon, Calif.; Weston, Mich.; Houston, Tex.; Chicago, Ill.; and Mount Pleasant, Tenn.

DOW 9 MONTHS' REPORT

Net income of \$61,262,295 or \$2.24 per share of outstanding common stock, has been reported by Dow Chemical Co. for the nine months ended February 29, 1960. Sales for the period totaled \$576,006,389.

During the same period of 1959, net income was \$41,768,855, amounting to \$1.59 per common share, on sales totaling \$511,353,127.

Associations Meetings

NPFI NAMES "WORLD CHAMPION SUGAR BEET GROWER"



Dr. Bahme congratulates Domingos

Beet Sugar King John Domingos of Salinas, Calif., on May 10 was awarded an achievement plaque by the National Plant Food Institute. It proclaimed him "World Champion Sugar Beet Grower" before Agricultural Committee members of the San Francisco Chamber of Commerce and representatives of the fertilizer and beet sugar industries.

Domingos grew a record 53.6 tons of sugar beets per acre in 1959. With a sugar content of 15.89 per cent his beets produced a whopping 17,036 pounds of sugar per acre. That is well over 20 tons per acre more than the average production for his area.

Dr. Richard B. Bahme, Western regional director of the National Plant Food Institute made the presentation to Domingos.

SALES CLINIC PLANS ANNOUNCED

The Annual Sales Clinic conducted by the Salesmen's Association of the American Chemical Industry will be held this year on Monday, November 14, at the Hotel Roosevelt in New York City.

James E. Shand, Allied Chemical Corp., Sales Clinic committee chairman, reports that after study-

ing the indicated needs of chemical salesmen his group has decided that this year's meeting will cover three general categories:

What makes a top-flight salesman,

Multi-level selling, and

The salesman's relation to product management, product development and market research.

"READ AND FOLLOW THE LABEL" CAMPAIGN UNDERWAY

Three leaflets—aimed at "Mr. Field Crops Producer" (#470), "Mr. Fruit and Vegetable Producer" (#471), and "Mr. Livestock Producer" (#472) have been released by the Extension Service of USDA. All stress the "Read and Follow the Label" theme.

L. S. Hitchner, executive secretary of the National Agricultural

Chemicals Association, who sent FC copies of the leaflets, points out that they "are further examples of the policy of the USDA with respect to pesticides as outlined by Secretary Benson in his statement on 'Chemicals and Foods.' "

They are sold by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C., at five cents a copy.

NPFI ASSISTS IN SPONSORING CONTEST FOR FARM EDITORS

A nationwide contest to determine the "Newspaper Farm Editor of the Year" has been established under sponsorship of the Newspaper Farm Editors Association and the National Plant Food Institute as an annual award.

NPFI President Paul T. Truitt explained that "the contest is de-

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signed to honor newspaper farm editors for their editorial contributions to efficiency in farming and for their over-all excellence in service to agriculture."

The award will be in the form of a scroll designating the recipient as the "Newspaper Farm Editor of the Year." Presentation will be made at the annual winter meeting of the association in Chicago.

STREP GERMS RIDE INSECTS

Insects have been carrying "strep" bacteria for years and spreading them on vegetable crops and non-edible plants, research at the University of Tennessee indicates.

Dr. J. Orvin Mundt, bacteriologist at the Tennessee Agricultural Experiment Station reported his research results at the May 1-5 meeting of the Society of American Bacteriologists in Philadelphia.

Working with George N. Eaves, former graduate student, he studied insects normally associated with field crops and plants. But they often found the streptococcal types of bacteria normally associated with man and warm-blooded animals hitching rides on and inside those insects. Apparently the insects pick up the bacteria from air, soil, water and other areas of their environment.

NEWLY FORMED N. J. SOCIETY WILL WELCOME MEMBERS

Research, education and plant food industry representatives active in New Jersey have been urged to join the Plant Food Educational Society of New Jersey and help to

form and carry out its programs.

The society was formed to "foster and promote the dissemination of useful and practical information regarding all forms of plant food and soil amendments and their application to soils and plants," reports William Reid of American Cyanamid Co., chairman of the society's Publicity Committee.

Yearly dues of \$5 can be sent to Charles A. LuBow, c/o Star Fish and Bone Fertilizer Co., 67 Laurel St. South, Bridgeton, N. J.

"FARMING FOR PROFIT" WIDELY DISTRIBUTED

Extensive promotion of "Farming for Profit" by the New York Bankers Association among its members is leading to widespread dissemination of the brochure in New York State.

The 16-page, two-color booklet, published by the National Plant Food Institute in cooperation with Cornell University and the New York bankers group, deals with soil fertility and farm profits.

Fifty-seven thousand copies have been distributed so far to more than 215 New York banks for use by farmers, 4-H Clubs, FFA members and other interested groups and persons.

A second joint banker-educational program on soil fertility has been initiated by NPF and the New York Association. It involves furnishing advertising mats on subjects related to sound soil fertility and the proper use of fertilizer and lime to the association's member banks.



Members of the board of directors of the Plant Food Educational Society of New Jersey. Seated are Jim Carroll, Chamberlin and Barclay, vice president; Stacey Randle, N. J. Agr. Experiment Station, secretary; Graham Campbell, Independent Mfg. Co., president; Chas. A. LuBow, Star Fish & Bone Fert. Co., treasurer; and Jack Dantinne, Baugh and Sons Co. Standing: Jack Litzelman, GLF Soil Building Service; Bob Lenhart, Potash Co. of America; William Reid, American Cyanamid Co.; Howard Stark, Lime-stone Products Corp. of America; and Ken Hall Nitrogen Div., Allied Chem. & Dye Corp. Jack Satterthwaite, Reed and Perrine, is not shown.

People

The American Agricultural Chemical Co.

Robert D. Weldon has been named manager, turf and garden fertilizer sales for Agrico, according to W. J. Turbeville, Jr., vice-president in charge of fertilizer sales. Weldon has had broad experience in sales and marketing, including several years in the turf and garden field.

American Cyanamid Co.

Charles L. Eisenhart of Lakeland has been promoted to triple superphosphate manager at the company's Brewster plant. He succeeds F. A. O'Neill who has been named assistant chief engineer. Eisenhart moves into his new job from the position of assistant triple superphosphate manager which he had held since last October.

Roy A. Marriott has been appointed manager of sales training for American Cyanamid's Agricultural Div. He had been sales coordinator for the division. Also announced was appointment of Omar L. Patton to district manager of the Denver District in the Western Region. Patton replaces Howard M. Geddes, who is returning to Canada to be with Cyanamid of Canada, Ltd.

American Potash & Chemical Corp. has transferred Robert E. Zator from its Whittier, Calif. laboratory to the firm's Los Angeles Office, where he joins the market research group as an analyst.

Armour Industrial Chemical Co. Justin A. Homan has been appointed fatty acid sales representative in the Southeast, succeeding Lee Van Slyke who has been named assistant manager of fatty acid sales.

Balfour, Guthrie & Co., Ltd. Harold E. Ferguson, vice president in charge of the Fertilizer Div., has

been elected to the board of directors and appointed a senior vice president.

California Spray-Chemical Corp. appointments: Jack Edminster as branch manager, merchandising sales for the Pacific Northwest; Richard S. Witmer as branch manager for the Hudson Valley, headquartering in Kingston, N. Y.; and Dr. Charles T. Lichy as field agronomist in the Fresno, Calif., area.

Chemagro Corp. F. R. Johnson becomes assistant director of sales.

He was formerly the company's technical sales representative for the western states, and holds a bachelor of science degree in agriculture and master's degree in soil chemistry from the University of Missouri.



Johnson

Collier Carbon and Chemical Corp. has appointed R. H. McGough as general manager of agricultural sales. Formerly manager of the Collier Chemical Sales Development Dept., McGough has been associated with the chemical and agricultural fields for 23 years. William R. Van Liere continues as manager of domestic agricultural sales.

Colloidal Products Corp. has named Thomas A. Hall as Northwest manager. He has been in the agricultural crop dusting and spraying business, operated a fruit orchard and recently did technical sales work in the farm chemicals field.

Food Machinery and Chemical Corp., Mineral Products Div. Justin A. Lewis, Jr. has been

named sales manager for barium and magnesia products. Robert Mawe succeeds him as district sales manager for the Cincinnati, Ohio area; Ralph Skaar was named assistant manager of the Phosphate Div.; and John Campbell becomes assistant manager for barium and magnesia products.

Geigy Agricultural Chemicals, Div. of Geigy Chemical Corp. Larry Harman has been promoted to sales manager of the Northwest sales district. With Geigy since 1947 as a sales representative,



Harman

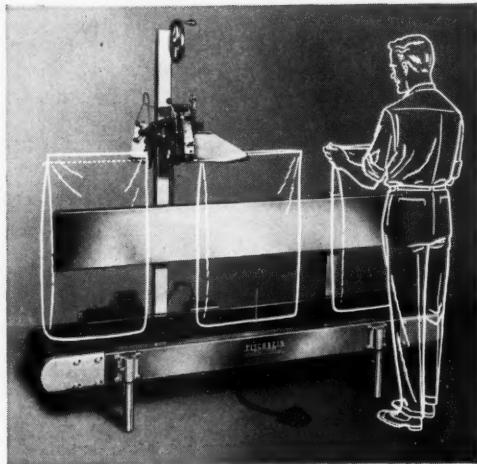
Harman will continue to maintain his headquarters in Walla Walla, Wash.

Roger Scott of Geigy's research staff in Ardsley, N. Y. has been promoted to field research repre-

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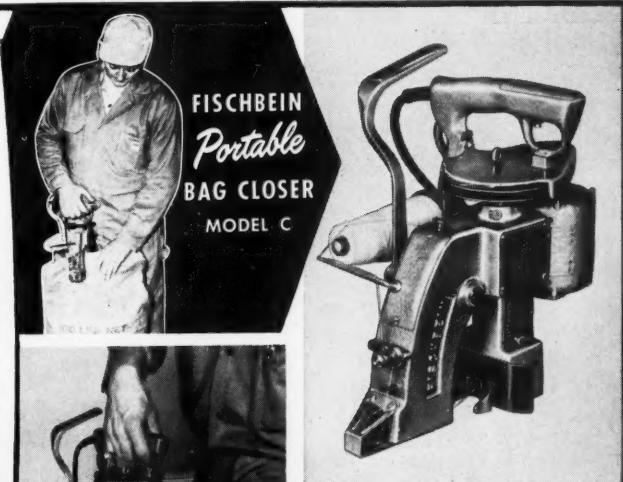
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sentative in the Pacific Northwest, headquartered at Yakima, Wash. Also located in Yakima will be a member of the sales staff, Gus Poletis, who goes to Geigy from Calspray. Howard S. Beaudoin becomes the sales representative serving the Portland, Ore. area and J. B. "Bernie" Plant who recently joined the firm as a sales representative will headquartered in Salt Lake City, Utah.

Appointment of William G. Westmoreland as sales representative in North and South Carolina, East Tennessee and North Georgia also was announced. Westmoreland formerly was agronomy specialist in weed activities with the N. C. Extension Service.



Westmoreland



Jefferson

Raymond J. Jefferson becomes sales representative for Indiana and Kentucky. Jefferson recently was employed as a fieldman for the New York Farm Bureau and for five years was Northeast regional manager for Olin Mathieson Chemical Corp.

General Chemical Div., Allied Chemical Corp. Appointment of John L. Damon, previously agricultural chemical sales manager, to the position of director of agricultural chemicals was announced by Frank J. French, president. Damon, with the division 24 years, will assume direction of all activities related to the division's agri-



Damon



French

cultural chemical products, including sales, purchasing, manufacturing and research.

Frank J. Woods becomes director of sales for the General Chemical Div. With the division 22 years, Woods has been heavy chemical sales manager for the past ten.

W. R. Grace & Co., Grace Chemical Div.

F. Wayne Weaver joins the sales staff of the Memphis district. He will cover the trade in Arkansas, Louisiana and Oklahoma. Formerly, Weaver sold fertilizer materials for Phillips Petroleum Co.



Weaver

Hooker Chemicals Ltd. Thomas F. Willers was elected president of the company at a meeting of directors held April 27 at corporate headquarters of the parent company, Hooker Chemical Corp. Willers also is a vice president of Hooker Chemical Corp.

Other company officers elected were James G. Baldwin and Horace W. Hooker, vice presidents; Ansley Wilcox II, secretary; Edward W. Mathias, treasurer; Thorsten O. Hammerstrom, assistant treasurer; and Douglas M. More, assistant secretary.

International Minerals & Chemical Corp.

Mervyn A. Upham is named operations manager for the firm's potash mine in Canada. A 14-year veteran of Canadian underground mining, Upham was mine manager of Rio Tinto's 28-million Milliken Lake uranium mines and plant before joining IMC last March.

IMC is sinking a 3,100-foot shaft near Esterhazy, Sask., in what the company describes as the largest

known deposit of high-grade potash in the world.

In the Development Department of the Research, Engineering and Development Div. three appointments were announced: Lewis Barry was named manager of the Florida Experiment Station, Mulberry; Robert Shelter, senior process engineer at Bonnie, Fla., was promoted to senior development engineer; and Donald Smalter was promoted to staff manager of development planning in Skokie.

Merrill M. Parsons becomes an IMC agricultural market analyst, and Dr. Jack F. B. Silman joins the Mining and Exploration Dept. as an exploration geologist.

W. Alec Jordan Associates.

W. Alec Jordan has been elected to the board of directors of American Alcolac Corp., Baltimore.

Merck Chemical Div., Merck & Co., Inc. Donald E. Tucker and Daniel J. Leyman have been appointed agricultural products sales representatives. Tucker will cover southern Georgia, southern Alabama and Florida; Leyman, northern Indiana and western Michigan.

Monsanto Chemical Co. Dr. Louis Fernandez, director of nitrogen products for the Inorganic Chemicals Div., has been appointed director of sales for marketing administration for the division's Marketing Dept., a newly created position. He is responsible for the functions of technical sales and service, sales administration, advertising and sales promotion, market research and personnel recruiting and training.

Stanley B. Johnson, assistant director of engineering, replaces Fernandez as director of nitrogen products, and Robert T. Webber, research group leader, became assistant director of engineering. John B. Trotter, director of sales administration, becomes director of sales, special products.

Dr. George W. Selleck has joined Monsanto as a project manager in the agricultural chemicals section of the Organic Chemicals Div.

Francis J. Curtis, 65, retired vice president for personnel and former board member of Monsanto, died



Upham

April 21 of heart disease in Barnes Hospital, St. Louis. Curtis, who retired from Monsanto on April 30, 1959, had been with the company 44 years.

National Plant Food Institute. Dr. Robert L. Beacher, well-known soil scientist, has been named southern regional director. Formerly Southwestern regional director for NPFI, Dr. Beacher's region has been expanded to cover 12 states as follows: Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas and Virginia. He succeeds Dr. Samuel L. Tisdale, now with The Sulphur Institute.

E. K. Chandler, former NPFI district representative at Knoxville, Tenn., has been assigned responsibility for the four Southwestern states of Arkansas, Louisiana, Oklahoma and Texas, with headquarters in Shreveport, La.



Wilson receiving citation

Above, Orville F. Walker (right), immediate past president of the National Association County Agricultural Agents, looks on as Ervin L. Peterson (left), assistant secretary of agriculture, congratulates Louis H. Wilson, NPFI secretary and director of information, recipient of the first citation presented by the association for his "untiring efforts . . . valued counsel and advice and productive service in the improvement of American agriculture."

The presentation was made by Walker in Washington, D. C., April 27.

Pan American Sulphur Co. Marlin E. Sandlin has been elected chairman, succeeding J. R. Parten. He also will serve as general counsel for Pan American.

Nitrogen Div., Allied Chemical Corp. Harold W. Caldwell joins the division as a sales trainee in the Indianapolis, Ind. district. A native of Birmingham, Ala., he holds a bachelor of science degree in industrial management from the University of



Caldwell

Rhode Island.

Stepan Chemical Co. Eldridge

J. Black becomes vice-president and general manager of the newly-formed Industrial Chemicals Div. He had been vice president of sales. Stepan said that this promotion is a part of the corporate reorganization it is undertaking.

Walter N. La Porte goes to



Black



La Porte

Stepan as director of manufacturing of the Industrial Chemicals Div. He had been with Monsanto Chemical Co. as manufacturing superintendent.

Swift & Co. H. P. Gould, manager of the Phosphate Center, Bartow, Fla., announces appointment of R. E. Kelly as head of the Center's Customer Service Dept., succeeding Vernon Shirley, who passed away suddenly in March.



Gould

Kelly has had varied experience in Swift's agricultural chemical operations, serving in manufacturing and sales capacities in Bartow, Chicago and Atlanta.

Virginia-Carolina Chemical Corp. In May, the board of directors elected Edward R. Adams, Andrew A. Farrell and A. P. Gates as vice presidents. Concurrently, R. Daniel Smith, Jr., company attorney, was named general counsel.

Adams, formerly controller, was elected vice president—finance;

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NEWS OF THE INDUSTRY



Adams



Farrell



Gates



Smith

Farrell, general manager, Mining Div., was named vice president in charge of mining; and Gates, general sales manager of the Fertilizer Div., was elected vice president in charge of fertilizer sales.

The board announced with regret that it had become necessary for C. E. Heinrichs, formerly vice president in charge of mining, to relinquish his duties because of ill health. He will continue as a consultant and board member.

In other action, the V-C board approved purchase of the company's 37th fertilizer plant. The acquisition, a seven-year-old plant of the Neosho Fertilizer Co. in Chanute, Kansas, represents V-C's farthest penetration into the midwest. It will go into operation July 1.

Western Phosphates, Inc. E. I. Lentz, vice president and general manager, has been elected chairman of the Utah Natural Resources Committee.

NATIONAL FARM SAFETY WEEK BEGINS JULY 24

The President has proclaimed the week beginning July 24 as National Farm Safety Week. USDA and the National Safety Council co-sponsor this observance in cooperation with state agriculture extension services, farm organizations, the farm press, radio, television and other groups.

Theme this year is "Enjoy Farm Life—Practice Safety."

Government

USDA SCIENTIST URGES OBJECTIVE EVALUATION OF RESIDUE PROBLEM

Sound scientific consideration must be given all factors related to the pesticide residue problem associated with insect control, a USDA scientist told a symposium on agricultural chemicals in Beltsville recently.

Dr. Edward F. Knipling, director of entomology research for USDA's Agricultural Research Service, said this approach is necessary if the Nation is to take full advantage of recent scientific advances in control of insects that prey on food and feed crops and livestock.

"Stringent Laws"

The importance of producing high quality foods free of hazardous residues cannot be overemphasized, he said. Dr. Knipling pointed out that under existing law use of a particular insecticide must not only be non-hazardous to man, but must also meet other requirements of law.

The overall picture of the insecticide hazard painted in popular or scientific publications by some alarmists is more imaginary than real, Dr. Knipling said. "This has led," he stated, "to more stringent laws and rigid interpretations of such laws regulating the use of insecticides and other pesticides. As a result, we face a growing problem in our efforts to maintain essential control of insect pests with currently available methods, and to develop new ones."

In discussing the hazards of insect control, the scientist said there was not a single case of chronic poisoning of man proved to be caused by insecticide residues in foods.

On Fish and Wildlife

"Local adverse effects on fish and wildlife may result from the use of certain insecticides, and every effort must be made to avoid such losses," Dr. Knipling said. "But contrary to implications by some writers, I have seen no evidence of an overall decline in the Nation's resources of fish and game that can be attributed to insecticides."

Dr. Knipling pointed out that, in

most instances, adverse effects of chemicals on beneficial insects, parasites and predators have been temporary, and there is no evidence of any general upset in the balance of beneficial and destructive insects.

Responsibility of the Public

The public is entitled to both high standards of insect control and high standards of safety in control procedures, Dr. Knipling said. If the public is convinced that the many highly effective and proved methods of insect control do not provide the standards of safety desired, he said, it must be prepared to support research to develop more acceptable methods, or to accept short supplies, inferior quality, and higher prices for many foods.

The resources available for agricultural research, said Dr. Knipling, have made it impossible to meet current problems and at the same time begin laying a firm foundation for better long-range solutions to insect problems.

U. S., INDIA SIGN "FOOD FOR PEACE" AGREEMENT

On May 4, the Governments of the United States and India signed an agreement which provides for the sale to India over a four-year period of sixteen million metric tons (about 587 million bushels) of United States wheat and one million metric tons (about 22 million bags) of United States rice.

For these commodities, plus some ocean transportation cost, India will pay the United States \$1,276 million in rupees under Title I of the Public Law 480 program, reports James C. Hagerty, press secretary to the President.

Of the rupees to be acquired by the United States in payment for these commodities, \$1,076 million will be made available to the Government of India for economic development projects (one-half as loans, one-half as grants). The remaining \$200 million will be used to pay United States expenses abroad and to finance other United States agency programs including development of foreign markets for United States agricultural products.

Chemicals

COLLIER INTRODUCES NEW FERTILIZER PRODUCT

Collier Carbon and Chemical Corp. is marketing and distributing a new nitrogen and zinc fertilizer, under the name Brea Brand Aquaz. Collier has added zinc as a minor element to its aqua ammonia solution fertilizer.

Extensive field testing, the company said, has indicated that zinc is the most widespread micro-nutrient deficiency in western states, and that next to nitrogen, zinc is more generally deficient than any other element.

A special technical service report describing the nature of zinc deficiencies and how they may be recognized is available by

CIRCLING 196 ON SERVICE CARD

THREE EXPERIMENTAL INSECTICIDES BY CHEMAGRO

Three new experimental agricultural insecticides have been released by Chemagro Corp. for general field evaluation in the United States and Canada. Invented by Farbenfabriken Bayer, A.G., Leverkusen, Germany, these materials have already been extensively evaluated in many parts of the world.

Bayer 29493 is 0,0-Dimethyl 0-[4-(methylthio)-m-tolyl] phosphorothioate. In some parts of the world it is referred to as Baytex. Evaluators are acclaiming Bayer 29493 as the possible successor to DDT, Chemagro said.

The World Health Organization has evaluated Bayer 29493 under the name Baytex in many parts of the world against lice, ticks, flies,

mosquitoes and bed bugs.

In agricultural areas where mites are resistant to the currently available materials, two non-phosphate compounds are now available for testing to control these pests. These materials are being tested under the code numbers Bayer 28589 and Bayer 30686. Bayer 28589 is 2,6-Di-*tert*-butyl-4-nitrophenol. Bayer 30686 is 2,3-Quinoxalinedithiol cyclic trithiocarbonate. While unrelated to each other chemically, these materials have in common marked specificity for the control of mites. They are expected to be available commercially within a year's time.

HYDROCHLORIC ACID POURED IN HAND



Ayerst Laboratories

Protective power of an industrial barrier cream is shown in this dramatic photograph. These hands were coated with "Kerodex" type 71 barrier cream, used in American industry as a protection against irritants. Then a bottle of pure hydrochloric acid was slowly poured into the palm, running down and around the fingers before splashing off. After washing, inspection of the skin reportedly revealed no trace of burning or blistering.

NEW SEVIN CLEARANCE

Sevin insecticide has been granted label acceptance by USDA for use on tomatoes, eggplant and peppers, according to R. H. Wellman, manager of Crag Agricultural Chemicals, Union Carbide Corp. The carbamate insecticide was used by growers in 1959 for the first time to control insects on potatoes and beans.

GUIDE TO SILICONES

An up-to-the-minute summary of the forms, properties and applications of Dow Corning Silicones is contained in a free, 16-page brochure from Dow Corning Corp.

Silicone products reviewed range from adhesives to release agents, laminating resins to rubber compounds and electrical insulation to water repellents. The table of contents is arranged according to applications for quick easy reference.

For a copy

CIRCLE 197 ON SERVICE CARD

ETHION TOLERANCES

New label claims for ethion insecticide permit its use for the first time on beans, melons, green onions and strawberries, Niagara Chemical Div. reports. The registrations reflect FDA's recent acceptance of tolerances of 1 ppm for residues of the chemical on these crops. In addition, a similar tolerance approval allows its extended use on tomatoes.

CALSPRAY ADDS TEDION TO ISOTOX FORMULA

Calspray reports that Isotox has had its formula improved. Tedion, a miticide, has been added to the Isotox formula of malathion, lindane and DDT.

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NEWS OF THE INDUSTRY

MONSANTO MARKETS NEW HERBICIDE

A new farm chemical for control of both broadleaf and grassy annual weeds in corn fields now is being marketed by Monsanto Chemical Co. Trademarked Randox T, the compound is a pre-emergence herbicide applied to fields at planting either as a spray or in granular form.

Charles P. Zorsch, merchandising manager of agricultural chemical sales for Monsanto's Organic Chemicals Div., said that the use of Randox T should eliminate rotary hoeing and all but two cultivations of the corn. Zorsch said that Randox T is recommended for use only in corn.

The compound has been granted label registration by USDA on a no residue basis for use in corn as both granules and liquid.

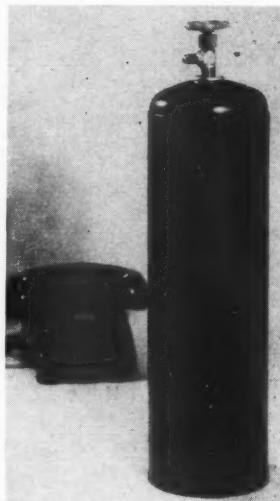
ULTRAVIOLET LIGHT AFFECTS DIURON, MONURON

Diuron and monuron lose effectiveness after prolonged exposure to ultraviolet light, found in sunlight, USDA agronomists report.

Loss of effectiveness can seriously hamper weed control with these chemicals in crop growing areas of little rainfall and much sunshine, according to Lyle W. Weldon and F. Leonard Timmons of USDA's Agricultural Research Service. Their studies may explain, in part, why herbicides sometimes

fail to be effective in arid areas such as are found in parts of the western United States. They believe that chemical decomposition of both weed killers may take place before they are carried into the soil by rainfall or irrigation. Industry researchers have already shown that the effectiveness of monuron is reduced 83 per cent after 148 days of exposure to sunshine.

In laboratory tests conducted in cooperation with the Wyoming Agricultural Experiment Station, the two scientists recorded a 75 per cent reduction in the effectiveness of each chemical after it had been exposed to ultraviolet light for 28 hours. This period of time is equal to about 8 to 12 days of full sunshine. However, extensive field research is necessary before any definite daily equivalents can be determined.

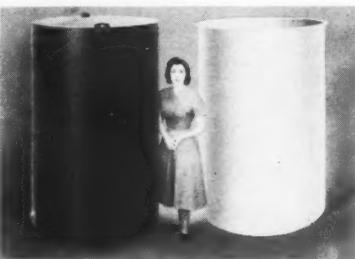


capacity. Among its applications: for aerosols, insecticides, industrial and commercial sprays.

Details are available. Simply CIRCLE 199 ON SERVICE CARD

Equipment Supplies

500 GALLON POLYETHYLENE STORAGE TANKS



Introduction of polyethylene storage tanks in the 500 gallon capacity range has been announced by Delaware Barrel & Drum Co.

Several styles are available: full open head, closed head with openings, flat or conical bottoms.

The manufacturer says that extensive field testing and on-location experience shows no outer support is needed.

For details,

CIRCLE 198 ON SERVICE CARD

NEW SUPER SIZE DISPOSABLE CONTAINER

Tube Manifold Corp. says its new super size disposable container for working pressures up to 240 psi is the only disposable metal container of its size now available. The 5" diameter container is 16½" long and has 10 pound water

NINE NEW GANDY APPLICATORS

In observance of 25 years in the farm chemicals field, Gandy Co. has introduced nine new models to its 1960 line of granular chemical applicators for soil insect and/or weed control. Now, the company says, with its 12 models it has a unit to fit any planting equipment, lister, cultivator or tool bar and provides single or tandem mountings for both narrow and wide row-crop equipment.

For information on the Gandy line,

CIRCLE 200 ON SERVICE CARD

SIX TRACTOR SHOVEL MODELS DESCRIBED

A new four-color bulletin describing the power, speed and handling characteristics of six Michigan line tractor shovels has been published by Clark Equipment Co.'s Construction Machinery Div.

Covering Models 55A, 55B, 75A, 85A, 125A and 175A, the bulletin is thoroughly illustrated with working drawings and photographs. The publication is broken down into convenient reference sections. These include one devoted to general specifications for each tractor shovel model and others on the power train, hydraulic system, "bonus bucket" and overall engineering features.

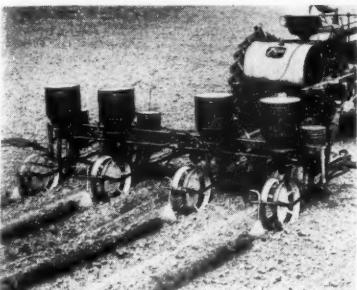
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**TRYCO ANNOUNCES
SPRAY EQUIPMENT**



Tryco Mfg. Co. has announced availability of pre-emerge spray equipment. Two, four and six row units are available as complete sprayers or as kits for adding to spray equipment already owned.

Nozzle mount brackets are easily attached to each packer wheel, Tryco says, and very accurate adjustments can be made in any direction to correctly position the nozzle. A 50 mesh stainless steel strainer, plus individual nozzle screens, protect the tips.

Obtain details by
CIRCLING 202 ON SERVICE CARD

Suppliers Briefs

Bemis Bro. Bag Co. F. G. Bemis, chairman of the board, has been reelected a board member of the National Industrial Conference Board for a term of one year. Founded in 1916, the conference board is an independent, non-profit institution for business and industrial fact finding through scientific research.

Clupak Inc. Clupak extensible paper has now entered the European market with the start of full-scale production by Dynas Aktiebolag in Sweden of the new paper. Shipments have already begun to United Kingdom and other European countries, Clupak announced.

Continental Can Co. A. J. Civitello has been named manager of the flexible packaging plant in Devon, Pa.

Dodge & Olcott, Inc. has presented a \$1,000 scholarship, under the auspices of the Institute of Food Technologists, to Theodore P. Labuza, Massachusetts Institute of Technology.

Dorr-Oliver Inc. Henry W. Hitzrot has been appointed to the Project Dept., where he will be concerned with development and sales of complete phosphate rock, phosphoric acid and fertilizer processing units. He has been with the company since 1927.

Graver Water Conditioning Co. Martin Wank has been named sales promotion manager, responsible for all advertising, public relations and sales promotion programs of the company.

International Paper Co's board of directors has elected Wallace K. Graves, George H. Rand and John L. Tower as vice presidents. Edward Z. King, Jr. becomes comptroller and John S. Maxwell, assistant treasurer.

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FARM CHEMICALS HANDBOOK

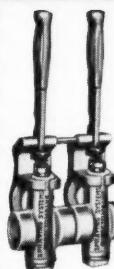
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NEWS OF THE INDUSTRY



VEGETABLES



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FERRO CORPORATION
Agricultural Division
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Kraft Bag Corp. Following announcement of the completion and full operation of a new 300,000 sq. ft. multiwall bag manufacturing plant at St. Marys, Ga., Edward Burgers, Jr., sales manager, reports the following appointments:

P. F. Finley has been promoted to Southeastern sales manager, with headquarters in Raleigh, N. C. F. C. Joos, Jr. has been assigned the additional territory of western Kentucky and Tennessee. P. E. Bray will cover southern Georgia and Florida, working out of Jacksonville. A. E. Rood, Jr., working out of Atlanta, will cover northern Georgia, Alabama and eastern Tennessee. R. A. Port will headquartered in New Orleans, covering Mississippi, Louisiana and Texas, and R. E. Burke will cover Virginia, Maryland and Delaware, headquartered in Baltimore.

Link-Belt Co. A total of 758 individual gauging operations is required to produce a single spherical



cal roller bearing at its new bearing plant in Indianapolis, L-B reports. Now in full production, the plant is described as one of the most modern of its kind.

National Carbon Co., Div. of Union Carbide Corp. N. Keith Demmon has been named manager for the manufacturing organization. The Industrial Carbon Marketing Dept. has established three product application sections. Reporting to A. W. Wolff, manager of industrial carbon marketing, are: A. F. Griffith, manager of electrical and metallurgical applications; P. J. Hastings, manager of nuclear applications; and J. J. Sherlock, manager of mechanical applications.

St. Regis Paper Co. Net sales in the first quarter of 1960 amounted to \$121,997,310, with net earnings at \$5,951,696, equal to 60 cents a share on 9,740,596 shares of common stock. This compared with net sales of \$104,244,045 and net earnings of \$5,794,081, equal to 63 cents a share on 8,943,219 shares of common stock in the first three months of last year.

Appointment of C. C. Smith as district sales manager of the Cleveland sales area of its Bag Division was announced by St. Regis. The area includes northern Ohio and western Pennsylvania.

A. E. Staley Manufacturing Co. has named Lance A. Wise as assistant public relations director and editor of the Staley Journal.

Texas Butadiene and Chemical Corp. John P. Maguire Jr. will join the firm as corporate secretary and general counsel.

Vulcan-Associated Container Companies, Inc. David W. Lynch has been named general sales manager and Donald R. Hoover assistant sales manager. Lynch will headquartered at the company's executive offices in Birmingham, and Hoover will have his office at Bellwood, Ill.

VULCAN CONTAINERS, INC. Vern I. McCarthy, Jr., president, has

been named to the board of trustees of the School of Packaging Foundation at Michigan State University. The foundation was created to meet the need for technically trained experts also trained for administrative work.

ATLANTIC-VULCAN STEEL CONTAINERS, INC. Announcement has been made of completion of a new 25,000 square foot building and commencement of full scale production at Peabody, Mass., by Gordon D. Zuck, president. Steel pails and slip cover ink cans are being produced at the new plant.

Calspray Opens New Kennewick Facilities

Five million dollar fertilizer plant dedicated May 17 includes high pressure nitric acid, ammonium nitrate and complex fertilizer units

CALIFORNIA SPRAY-CHEMICAL CORPORATION (subsidiary of California Chemical Company) with the opening of its new Kennewick plant in Washington recognizes the expanding agricultural development in that region and its great future. This multi-million dollar facility will produce a complete line of liquid and dry ORTHO fertilizers including the exclusive ORTHO type high-analysis pelleted plant foods.

This most recent expansion of Calspray represents a \$5-million fertilizer plant that is presently on stream and was dedicated at formal ceremonies at the plant on May 17, 1960. The plant site was selected because of its strategic location as far as shipping connections and an unlimited supply of water from the Columbia River, which is a very important factor in an operation of this type.

The three major segments of this plant were designed and constructed by The Chemical and Industrial Corp. of Cincinnati, Ohio and are described below:

NITRIC ACID PLANT DESCRIBED

The first unit is a C&I type high pressure nitric acid plant with a daily capacity of 150 tons of nitric acid on a 100% basis, produced at a 57% concentration. This plant is equipped with an electric motor driven centrifugal compressor and expander turbine and is the most modern of its type in the country.

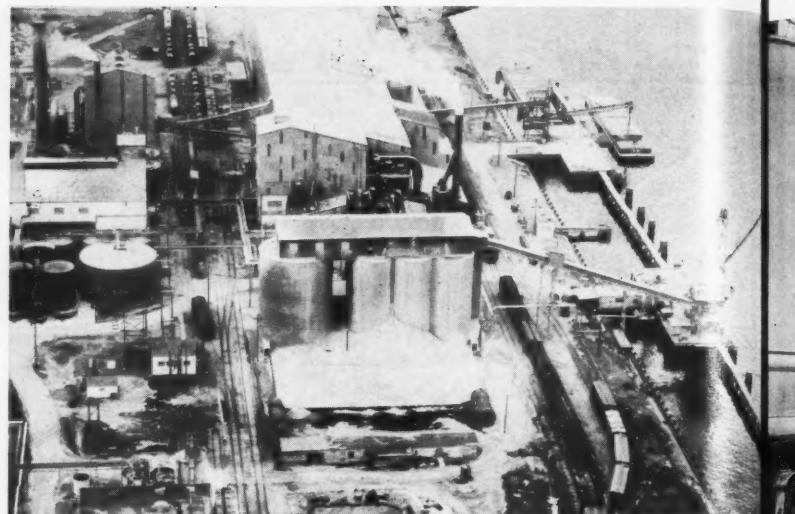
The second segment of this plant is the ammonium nitrate prilling plant and solutions section, and ammonium nitrate solutions plant. This plant is equipped with C&I's new process for producing prilled ammonium nitrate which prills an almost anhydrous ammonium nitrate melt and hence needs only a very

small distance of free fall for the pellet to completely solidify. Prills produced by this method are superior in their physical characteristics and nitrogen content. The prilling tower is approximately one-third the height of the conventional towers that prill an ammonium nitrate solution at a concentration of 95%-96%. This portion of the facilities has a daily capacity of 150 tons of fertilizer grade prilled ammonium nitrate and simultaneously can make quantities of ammonium nitrate-ammonia solutions and other fortified nitrogen solutions.

THE COMPLEX FERTILIZER PLANT

The third segment of these facilities is the complex fertilizer plant. This plant incorporates the PEC acidulating and ammoniating section along with C&I's spherodizer which pelletizes the slurry after it has been mixed in the first section of the plant. The plant can produce any of the grades of fertilizer needed and the nitrophosphate plant food that is produced will be tailored to the needs of the crops grown in the Northwest. The combination of the PEC acidulating and ammoniating section together with C&I's spherodizer gives Calspray the most outstanding and modern complex fertilizer plant that is available utilizing a continuous chemical process. The spherodizer eliminates the maze of material handling equipment that usually accompanies a conventional granulating plant and materially lowers the recycle rate.

All three of these segments went on stream prior to their scheduled date and represent the most modern plants of this type available that will produce superior complex fertilizers and fertilizer materials. ▲



Olin Mathieson



LEFT: S. L. Nevins, corporate vice president, Olin Mathieson Chemical Corp.

TOP, LEFT TO RIGHT:

The De Bardeleben Marine I unloads her cargo of phosphate rock from Tampa, Florida.

Overall view shows the entire high analysis fertilizer plant of Olin Mathieson Chemical Corporation, at Pasadena, Texas, the world's largest of its type.

Ground phosphate rock is stored in these gigantic bins at the fertilizer plant. Here some of the ground rock is being drawn off for shipment.

High analysis fertilizer pellets are being dried in this giant tube at the rate of 150 tons per hour.

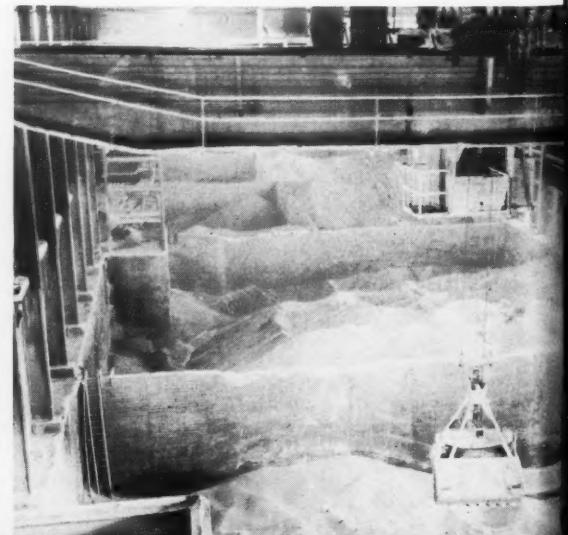
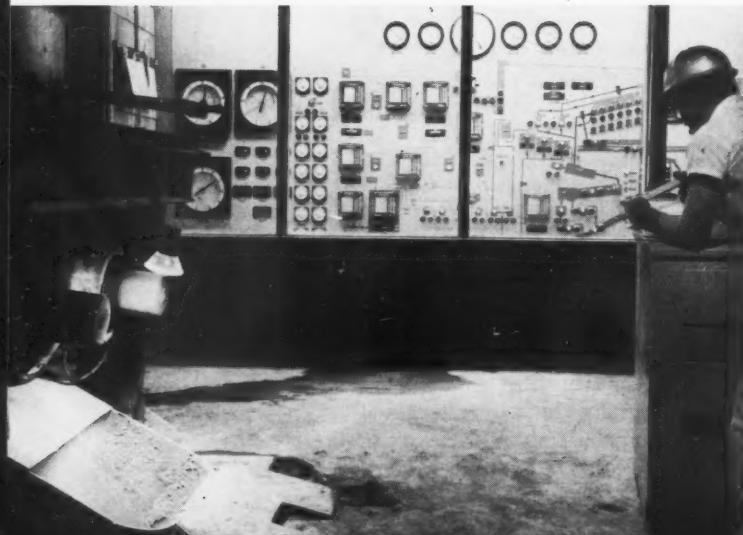
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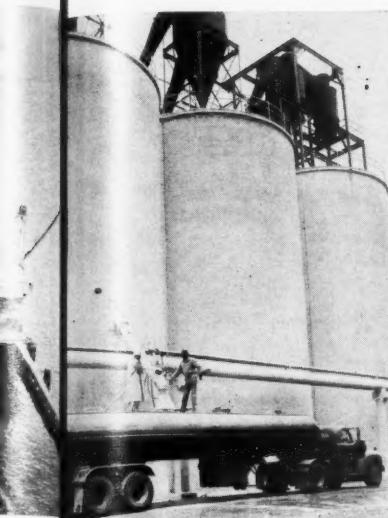
This panel is the nerve center for production of the added capacity of high analysis fertilizer. An operator, right, checks panel figures on his slide rule.

In this huge building, the finished product is stored. The various grades are separated by high concrete partitions.

At the gravity flow bagging operation, the operator is bagging Ammo-Phos. This particular grade happens to be 15-15-15.

At the railhead, box cars are loaded with bulk fertilizer for immediate shipping.





on Dedicates Pasadena Plant

THE REALIZATION of a long time dream has come to pass for S. L. Nevins, vice president of Olin Mathieson Chemical Corporation. On May 11, 1960, with ceremonies marking full scale output, he activated a \$1,500,000 addition to the existing high analysis fertilizer plant situated on the Houston Ship Channel, Pasadena, Texas.

The newly constructed section gives the plant a capacity of more than a ton of pelletized fertilizer every minute—or a 40 per cent gain over former output.

Mr. Nevins, an authority on high analysis pelletized fertilizer, dedicated the plant addition in hope that it would "help toward satisfying the food needs of an expanding population throughout the world."

MORE PLANT FOOD

High analysis fertilizers have grown more popular in recent years. In 1949 they accounted for 12 per cent of all fertilizer used. Last year in the United States 41 per cent of 25 million tons of fertilizer used was of the high analysis type. This included 550,000 tons of the ammonium phosphate type.

With the new addition to the plant, Olin Mathieson is adding new grades to its Ammo-Phos line. Among them are 15-15-15, 16-48-0, 14-28-14, 7-28-28, 9-36-18, 13-39-13, and 12-24-24, these grades being developed for a wide variety of crop and soil conditions.

PLANT LOCATION

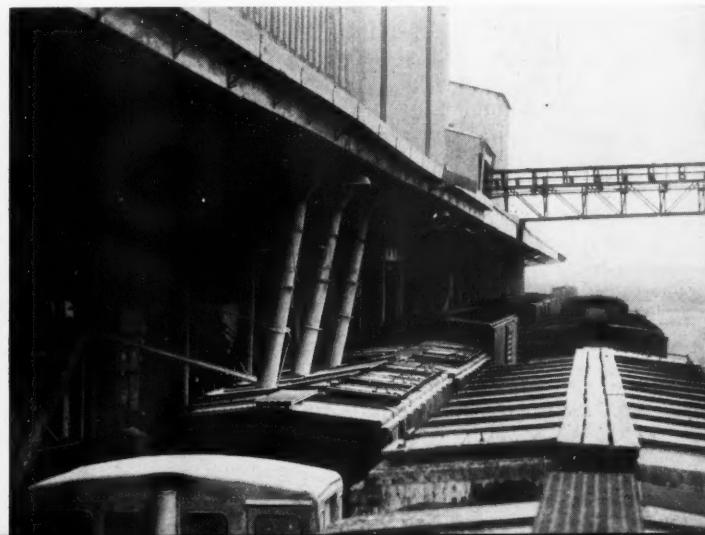
The plant's location on the Houston ship channel is ideal both from the standpoint of shipping in raw materials and shipping out finished products.

Phosphate rock comes by water from Tampa, Fla. Gulf vessels with cargoes of about 10,000 tons can unload at the plant.

Ammonia comes by rail from the corporation's facilities at Lake Charles, La., about 150 miles to the east and potash from Carlsbad, New Mexico.

The plant manufactures its own sulfuric acid from liquid sulfur obtained nearby.

Since 1950, Olin Mathieson has produced more than 3,500,000 tons of high analysis fertilizer. The added production gives the Pasadena plant a production capacity in excess of a half million tons per year. ▲



PESTICIDE FORMULATION:

A carrier producer's viewpoint

By GARTH COOMBS*

NEED FOR EFFECTIVE formulation is accentuated by the tremendous dollar investment required to find toxic compounds, screen their effectiveness, and develop the necessary field information for registration. In addition, the economic hazards of pest resistance and of competitive products always are near. Months of research effort should not be wasted because of insufficient formulation effort. Hardman and Thomas state that "...adequate evaluation in the field of a new toxicant poorly formulated cannot be made".¹ W. Duysjes puts it another way: "...incorrect formulation will make a useless product of a good pesticide".²

An understanding of many factors is required to optimize the chance of developing a good formulation. Some of these are: a) the biology of the pests and hosts, b) the characteristics of available production and application equipment, c) the toxicology of the pesticide in relation to plants, animals, and humans, d) the characteristics and relation to performance of the available formulation ingredients, and e) the cost of the formulation on a unit-available toxicant basis as related to the potential market and to competitive products.

Few organizations can afford the time to develop full knowledge concerning all the foregoing aspects of formulation. It is therefore useful to take advantage of the experience of the suppliers of the ingredients used in formulations. As a producer of diatomaceous earth (Celite) and synthetic calcium silicate (Micro-Cel) products, the Johns-Manville Corporation has found it desirable to undertake such a formulation service. By cooperative formulation studies with pesticide producers, it has been possible for Johns-Manville's knowledge concerning the application of J-M products to be added to the pesticide producer's knowledge of desirable product characteristics and thereby come up with formulations that have given

good field results from both a physical and a biological viewpoint.

OBJECTIVES IN FORMULATION

The objective in formulating a wettable powder or dust concentrate is to convert the technical pesticide into a particulate form, that, when diluted with either water or inert solids respectively, may be distributed so as to achieve the desired biological control. The ideal formulation must be suited for a range of conditions of application equipment, concentration, water hardness, water temperature, and type of foliage surface. The ideal formulation also should have the particle size range that assures optimum results. In addition, the ideal wettable powder formulation should have suitable properties of wettability, deflocculation, sprayability, foliage adherence, etc. Finally, the ideal formulation must maintain all these properties even after prolonged storage under adverse conditions.

FORMULATION STEPS

With these objectives in mind, what are the typical steps involved in developing a wettable powder formulation? Obviously each particular formulation has its own peculiar problems but certain aspects or considerations apply to most cases. Our formulation procedure is based on a cooperative effort between the carrier producer and the pesticide manufacturer who is interested in developing a satisfactory formulation.

1) Establish the Desired Product Performance:

The first step is to establish the desired product performance by joint discussion with the pesticide manufacturer or formulator. This discussion must consider the expected properties of the formulation, particularly in relation to method of application and limitations on methods or facilities for production. Generally limits can be set for certain properties from the manufacturers' knowledge of the biology of the pests and toxicant. For instance, approximate particle size range, wettability, suspendability, and storage stability may be known or estimated.

Of equal importance to knowledge of which standards should be met is knowledge of how these tests

*Research engineer, Johns-Manville Corporation.

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should be run. Test methods vary and in many cases this variation is enough to give noticeable differences in results. The WHO method serves as a widely known reference method, but it is not well suited for domestic formulations.³ Some properties, such as flowability, impose an additional problem in that there are a number of test methods available but few, if any, are realistic for the full range of powder densities and equipment designs met in the agricultural field.

2) Preliminary Compatibility Studies:

Next in developing a formulation is to begin establishing the compatibility or stability of the toxicant and the "inerts" under consideration. Obviously it would be unsatisfactory to develop a formulation in which part or all of the toxicant was decomposed because of some chemical or catalytic reaction with the "inerts". Normally, stability is evaluated by an accelerated test at elevated temperatures that has been, or is being, correlated with long-term tests under actual temperature conditions.

Several laboratory methods are used to test carriers or "inerts" and to predict their toxicant compatibility. These include determination of pK_a ,⁴ pH , moisture content, and ion exchange capacity.⁵ These methods have given reasonable correlations with some toxicants. However, the ultimate test is actual storage. Occasionally, satisfactory carriers are eliminated because of laboratory tests of this type when later long-term tests show reasonable stability. Also, a compromise is sometimes required when no carrier provides 100 per cent results. The use of deactivators,⁶ if known, becomes necessary in some cases.

3) Establish Concentration Limits for Carriers and Prepare a "Blank" Blend:

The third step is to evaluate the effects of varying the proportions of toxicant, carrier, and diluents, while temporarily omitting the surface-active agents from the formulation. This is done by preparing small test batches and comparing particle size, flowability, grindability, caking resistance, etc.

Liquid and semi-liquid toxicants are usually sprayed onto the carriers while they are agitated. For very small 50-100 gram samples we use a spray apparatus made from a half-gallon Mason jar with two holes drilled in the bottom and a modified "Osterizer" agitator. A special DeVilbiss 5001 spray nozzle, heated by a resistance wire, air atomizes the pre-weighed toxicant. The air is vented by an extraction-thimble vent or baghouse. For larger samples we use a one-gallon ribbon blender with variable speed drive and a pressure spray-pot. The pressurized pot may be heated by an electric mantle. A solenoid valve allows rapid shut-off to increase the accuracy of controlling the weight of the material sprayed.

Solid toxicants are usually ground with the carrier by low energy hammer milling. If a finer particle size range is required, the sample may then have to be air jet milled. During this preparation, rather empirical observations are made as to how well the sample handled during processing. An attempt is made to evaluate relative flowability and grindability.

The proportions of toxicant, carrier, and diluents used are chosen by a combination of trial and error and previous experience with toxicants of similar physical characteristics. If the toxicant is a low-viscosity liquid at room temperature, a higher percentage of absorptive carrier is needed than is required if the toxicant is a solid.

Experience has shown that the following "rule-of-thumb" generally correlates the sorptivity of the carriers with the set-point or melting point range of the toxicant, assuming the desired product is dry and flowable. The correlation is not precise because of the broad melting point range of impure toxicants and the empirical method of evaluating flowable powders. The sorptivity per unit of toxicant is calculated by summing the products of per cent carrier and the Gardner-Coleman water absorption⁷ for that carrier and dividing this sum by the per cent toxicant. Table I shows the range of sorptivities needed for several melting point ranges.

Table I
Sorptivities for Flowable Concentrates

	Melting Point Range	Unit Sorptivity
Liquids	$\leq 75^{\circ}\text{F}$	>275
Semi-solids	75°F to 200°F	275 to 135
Solids	$>200^{\circ}\text{F}$	<150

$$\text{Unit Sorptivity} = \frac{\Sigma (\% \text{ Carrier}) (\% \text{ Water Absorption})}{(\% \text{ Toxicant})}$$

4) Establish Suitable Surfactants and Other Additives:

The fourth step in developing a formulation is to determine suitable surfactants and other additives. Evaluation of surface-active agents normally starts with trial and error "compatibility" tests with a "blank" toxicant-carrier formulation. This "blank" was prepared during the previous step, by impregnation, hammer milling, and/or air jet milling. A "blank" sample is one that does not contain any surfactants when prepared. The concentration is purposely slightly higher than is ultimately desired, so that the addition of several per cent wetting and dispersing agents will dilute the formulation to the desired toxicity.

Although previous experience sometimes aids in the selection of wetting and dispersing agents, each toxicant-carrier system seems to be an individual case. The selection must attempt to account for the cost of the ingredient and the necessary percentage addition. The surfactants vary in their active concentration, as well as cost, so that a more expensive compound used at a lower concentration may be equal to a cheaper ingredient that must be used at higher concentrations. The physical form of the surface-active agents also affects their selection. Powdered products may be readily blended into a formulation, even at small additions. Liquid and waxy products are harder to add, particularly where uniform distribution of a small percentage is required. However, if the toxicant is to be spray impregnated onto the carrier and if the surfactant is miscible with the toxicant, they may be mixed and sprayed at one time. (Continued on next page)

PRODUCTION METHODS

It is impossible to test all the possible combinations of wetting and dispersing agents at their optimum concentration and at all the possible conditions of water hardness and temperature. Surfactants are therefore tested for compatibility at an arbitrarily selected concentration (2 to 5 per cent), water temperature (78°F), and water hardness (342 ppm). Individual samples of the toxicant-carrier "blank" plus wetting and dispersing agents are hand mixed and slurried in the test water. These samples are visually evaluated for wetting time, amount and stability of foam, deflocculation, and cake height after a given period. Generally surfactants that cause excessive foam, slow wetting, or do not deflocculate the sample may be eliminated by these compatibility tests. Several relatively good surfactant combinations are usually found and these are then tested in more detail, particularly at different concentrations and at different water hardesses.

The selection of ingredients to be included in these compatibility tests is a combination of "it-has-worked-before" and "it-was-on-the-shelf". The anionic or occasionally nonionic surfactants have generally proved to be the most successful. The lignon sulfonates offer an inexpensive source of efficient dispersing agents. Their main disadvantage is their dark color. Wetting agents are a difficult problem in that many of them cause excessive foaming. In agitated sprayers this can be a nuisance. The selection of wetting agents must sometimes be a compromise to minimize foaming and maximize wetting.

One very serious problem concerning laboratory evaluation of surface-active agents is not being able to predict their effect on biological performance. These ingredients will affect not only the preparation and deflocculation of the spray slurry, but also the droplet size of the spray, the initial spread and stick on the plant, and the retention or wash-off of the toxicant that is applied.⁸ This forces the selection of surfactants and their percentages to be made without knowledge of what may be the optimum. A poor choice could lead to poor field results. It has been suggested by Hardman and Thomas that field tests should be related to the amount of toxicant found on the plant rather than to the amount sprayed.¹ This would at least allow better evaluation of the toxicant even if non-optimum surfactants were used. Successful results must then initiate a search for the best formulation.

5) Prepare and Test Best Potential Formulations:

The fifth step is to evaluate in greater detail the one or more candidate surfactant combinations and concentrations found by the preceding steps. Test samples are prepared in small quantities of $\frac{1}{4}$ to 10 pounds by as close to a scaled-down production technique as can be simulated. The finished formulation is tested as extensively as possible in the laboratory. This can include particle size analysis, "before- and after-tropical storage" suspendability tests,² wetting time, foaming, surface tension, water hardness and temperature effects on suspendability, caking tests, screen analysis, stability tests, etc. The performance

of the samples is checked against the added cost of formulation per unit of toxicant.

6) Submit Formulation for Biological Test:

The sixth step is the biological evaluation of the formulation. This is usually the pesticide manufacturer's part of this "cooperative" formulation project. They are in the best position to run and interpret biological performance tests. If it is not possible to submit a formulation that meets all of the original goals, one or more alternative formulations may be presented. One of these may serve as an interim formulation, or they may show that the goals were unrealistic. In all cases, the practical, biological test should be made to see if a desirable formulation has been achieved.

After the results of greenhouse or field trials are compiled, it is again useful to get the interested personnel together to discuss the necessity or desirability of attempting to improve the formulation.

7) Large-scale Plant Trial:

With success in the limited field trials, the final step normally would be larger-scale production testing and extensive field testing. If the laboratory preparations were realistically made and if the desired production techniques can be followed, the large-scale tests should proceed without difficulty. However, since some of the effects of quantity production, such as operating temperatures of large-scale equipment, are difficult to predict, production tests are very necessary when low melting point materials, such as pesticides, are involved.

The formulations used in production trials should be conservative in design. The per cent carrier in the formulation should be ample for good results. Although this may make the initial formulation more expensive than necessary, once satisfactory production runs have been made, the formulation can be adjusted to balance production cost and product performance.

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We don't know how many of you have read old issues of the *pioneer fertilizer magazine* in the United States, but THE AMERICAN FERTILIZER will be mentioned many times by the older pio-

neers as they recall early attempts to organize the industry.

We went back into the files recently and read about the many obstacles the pioneers faced in setting up a national organization.

We found, for instance, that the National Fertilizer Association, organized in 1883, disbanded because of public disfavor. The initial issue (July 1894) of THE AMERICAN FERTILIZER immediately took up where the association left off.

" . . . with a journal now devoted to the promotion of the interests of the fertilizer industry closer union will result and greater benefit derived," the magazine assured industry leaders.

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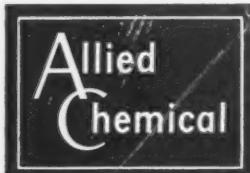
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